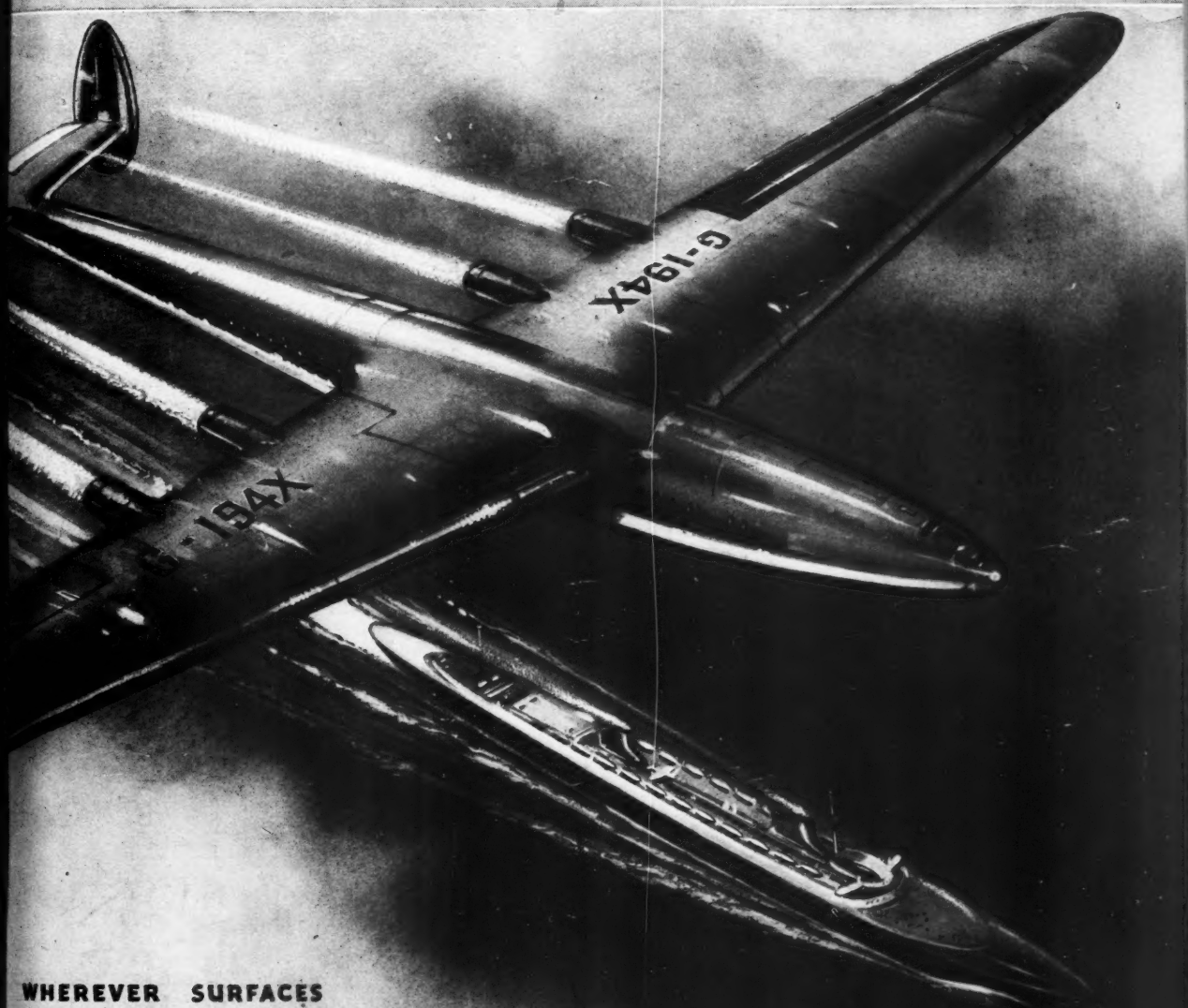
1894 Vol. XLVII APRIL 12th, 1945

FLIGHT

and

AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB ONE SHILLING

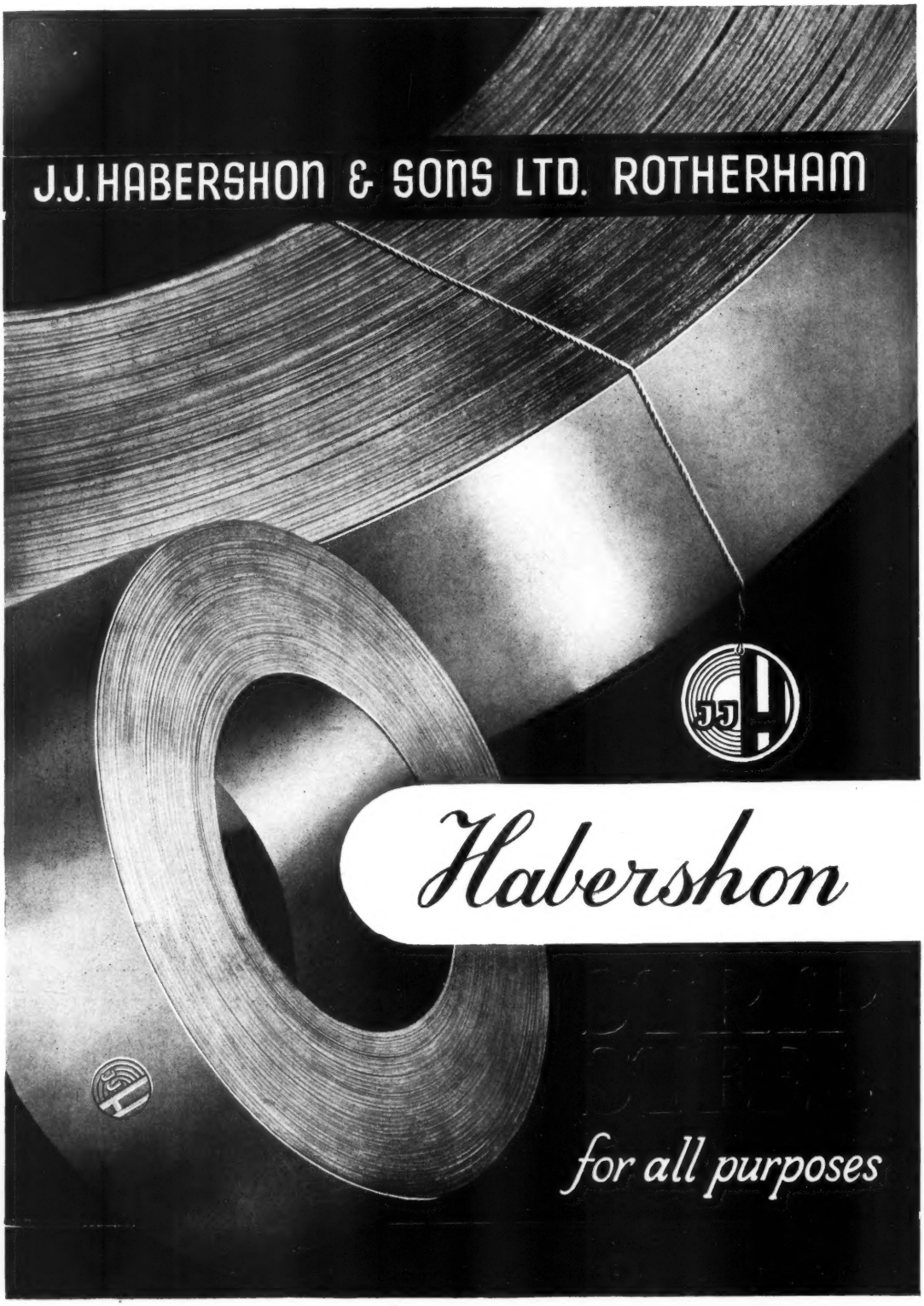


WHEREVER SURFACES
REQUIRE PROTECTION
'CELLON'
CAN PROVIDE THE FINISH

LIBRARY
HUGHES AIRCRAFT

CELLON LIMITED, KINGSTON-ON-THAMES, ENGLAND
Thorp-Hambrock Co., Ltd., Montreal, Canada.
Cellon Corporation Pty., Ltd., Sydney, Australia.

CELLON CVS-537


J.J.HABERSHON & SONS LTD. ROTHERHAM
JJH
Habershon
for all purposes

FLIGHT
and
AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor
C. M. POULSEN

Managing Editor
G. GEOFFREY SMITH, M.B.E.

War Correspondent
JOHN YOXALL

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (35 lines).

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.
BIRMINGHAM, 2: GUILDHALL BUILDINGS, NAVIGATION ST. Telegrams: Autopress, Birmingham. Telephone: Midland 2971 (5 lines).
MANCHESTER, 3: 260, DEANSGATE. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

Registered at the G.P.O. as a Newspaper.

No. 1894. Vol. XLVII. April 12th, 1945 Thursdays. One Shilling.

The Outlook

The Price Paid

IN the article "Air and the Rhine Crossing," attention is drawn to the heavy burden sustained by the Air Forces in order to keep down casualties in the ground services.

Bomber Command has, of course, taken a tremendous share, and it must be remembered that, in addition to the risks taken in their ordinary bombing programme, all the Halifax and Stirling tugs for Hamilcar and Horsa gliders are loaned by Bomber Command to the Allied Airborne Forces. The greatest admiration must also be felt for the cold courage of Transport Command pilots who make straight runs at only 600ft. over the dropping zones in unarmed and armourless Dakotas to drop paratroops or supplies.

Coastal Command, too, should not be forgotten. If the work of the aircrews of this unspectacular Command had been less ably carried out, none of the other forces or commands could have continued its existence. The splendid events which cheer us all to-day could never have taken place.

When peace comes once more and actualities fade into the distance, these facts must be remembered and the R.A.F. must have at least equal strength at the conference table with that enjoyed by the older services. No longer must air power he considered as a lowly but useful handmaiden who will always work well and never ask questions. The handmaiden of yesteryear is now the mistress and must be treated as such.

In financial matters also a proper sense of proportion must be maintained. It is most sincerely to be hoped that the Royal Air Force will never again see the day when they are thrown a wretched sixteen million pounds and told to manage as best they can for a year, while the Royal Navy is allowed to spend eight million pounds sterling on a single battleship which a few Lancasters, with 22,000lb. bombs on board, could blow straight out of the water, even more easily than they turned the *Tirpitz* over with 12,000lb. bombs.

Empire Air Training

THE geographical distribution of the British Empire has never been of greater benefit to every member of it than in connection with the Air Training Scheme which was closed down at the end of March.

The closing ceremony at the Uplands Training School, which was attended by H.E. the Governor General, the Earl of Athlone (brother of Queen Mary), was overcast by the tragedy which cost the lives of the Under-Secretary for Air Commander Brabner, D.S.O., D.S.C., M.P., R.N.V.R.; Mr. (late Major) H. A. Jones, C.M.G., M.C., the Director of Public Relations at the Air Ministry, and yet better known as the author of nearly all the official history of *The War in the Air*, 1914-1918, and other important passengers. They were flying out to attend the ceremony, but their aircraft did not arrive at the Azores. We recall, though it would be unseemly to adapt, Kipling's line: "If blood be the price of Admiralty, Lord God, we ha' paid in full."

Even in the days of their early successes, this Empire Training Scheme must have seemed ominous to the Germans. It was carried on beyond the range of their shells and bombs, and they could do nothing to interfere with it. It meant that, unless the Germans could crush Britain in the first year of the war, the Empire must in time establish air superiority over its enemies, with all the consequences which that implied. Germany is now reaping the whirlwind, and her once vaunted *Luftwaffe* is impotent to arrest it. For the last five years the scheme has produced from Canada alone an average of 25,000 trained members of aircrews annually, in addi-

tion to those who were trained in Britain and other Dominions. Australia has contributed 35,000 members of aircrews, most of them trained in Canada, and training has been carried on also in New Zealand, South Africa and Rhodesia.

The system of training was based on that evolved by the Empire Central Flying School in Great Britain, and was second to none in quality. The United States Army Air Forces also lent a hand.

One of the greatest benefits of the scheme was that men from all parts of the Empire met each other and worked together. They all worked happily together, and came to realise even more strongly than before that all were members of one family, and, for the most part, of one breed. The results of that community working will not end with the sounding of the "Cease Fire" in Europe or in the Pacific; while Canada will continue to train airmen from the United Kingdom in the future.

Air Transport Training

BREVITY was one of the more attractive features of the Government's recent White Paper on British Air Transport. That had the advantage that the broad policy could be fairly easily grasped, but inevitably it left many details vague. For instance, stress was laid on the fact that "the highest standards of skill and reliability must be achieved for aircrews and ground staff," and the statement was made that the three Corporations will maintain a combined training establishment at which their flying and technical staffs will be trained. Nothing was, however, said of the foundations upon which the combined training establishment is to be built.

No one, least of all corporations with little or no previous experience, can afford to ignore what has been done in the past. The White Paper's emphasis on "the highest standards" will be shared by everyone who has a knowledge of the subject of training. Nothing but the best will suffice if the Empire is to hold her own in post-war competition. But there is no indication that those responsible for drawing up the White Paper were aware that for many years before this war we had a training establishment which was, by common consent, the equal of anything in the world. We refer to the company known as Air Service Training, Ltd., of Hamble.

Before the war this firm, founded in 1930 at the instigation of the Air Ministry, had established a fine record. It undertook training of commercial airline pilots, navigators, wireless operators and licensed aircraft engineers. During the war, in a somewhat different form dictated by war needs, the firm has continued to give training of pilots for the R.A.F., Fleet Air Arm and B.O.A.C. It has given training in beam approach and other forms of assisted approach. It has trained flying control officers, airfield controllers, and maintenance engineers.

It would appear that with such a record A.S.T. must necessarily be included in the training programme of what Sir Wm. Hildred, Director-General of Civil Aviation, jestingly described as "the three incomprehensibles," either as the nucleus around which the training establishment is built, or as a private concern to which the "big three" delegate their training.

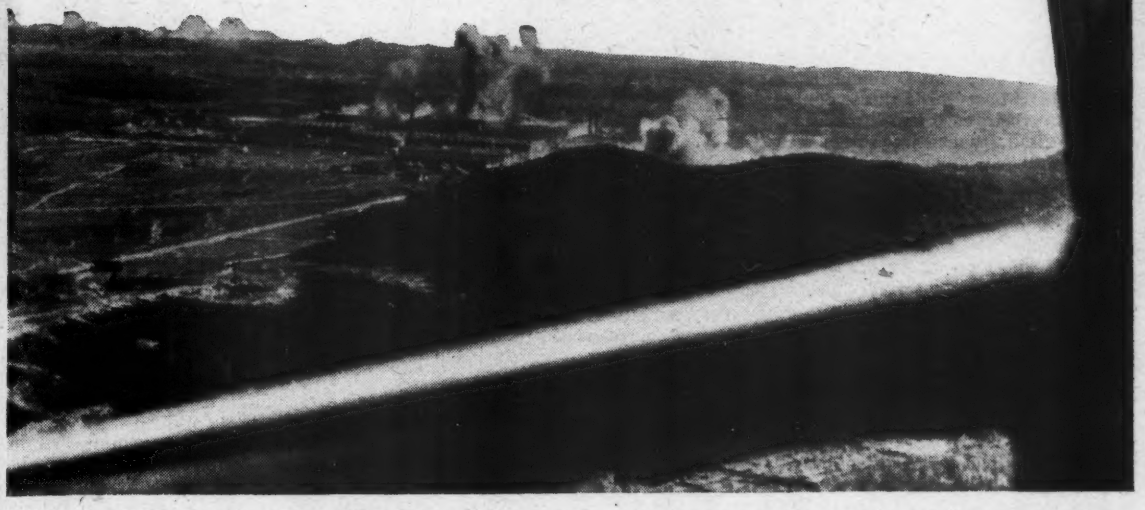
CONTENTS

The Outlook	381
War in the Air	383
Here and There	386
Air and the Rhine Crossing	388
On Jets and Turbines	392
The Miles M.48 and M.61	396
The de Havilland Dove	399
Blackburn Project	401
Correspondence	403
Service Aviation	404

ROAD TO THE ISLES: A. D.H. Dominie of a Transport Command communication flight which link the Western Isles with the Scottish mainland. After an outstanding civil career in pre-war days as the D.H. Rapide, the Dominie has put in some excellent war service. Its modern successor, the D.H. Dove, is described on pages 399 and 400.

WAR in the AIR

The Ruhr Surrounded : U-boat Bases Bombed : Eder Dam Repaired : Russia and Japan



INPUT TO STOP OUTPUT : Carrier based aircraft attack a factory area in the suburbs of Tokyo.

IT is not possible for the records of a weekly paper to keep pace with the tanks and aircraft which are dashing across Germany. Anything written one day is almost certain to be out of date on the next. One can only venture on a general survey.

It is no longer necessary for Bomber Command to rain down explosives on the cities of the Ruhr. American armies have surrounded the whole area, and if any of the factories are still turning out war material, the products will be of no use to the general forces of Hitler. They can at best be used by the large body of troops shut up in the area. The Germans have made some attempts to burst the ring of American forces, but without success. Gen. Eisenhower, a man who is cautious in his use of words, has spoken of the encircled German force as "ripe for annihilation."

Our old friend Hamm, with its famous marshalling yards, is now firmly in Allied hands, and here, too, it will no longer be necessary for Allied bombers to spend time and trouble in dislocating the intricate series of railway lines which made the place important.

Down in the south another familiar name, that of Wiener Neustadt, will no longer need to appear in the list of targets bombed. It, too, with its great Messerschmitt aircraft works, is safely in the possession of the Allies.

There is some doubt about the position of the V-bomb sites in northern Holland. A few days ago Gen. Eisenhower said that no commander would wait to attack an area which must fall into his hands as he won the main contest. Yet, as we write, it seems that Gen. Crerar's 1st Canadian Army is turning northwards to clear Holland of the enemy. The object cannot merely be to seize the rocket bomb sites (though such a success would be very welcome to the enduring people of southern England), but there is great need to bring relief to the starving folk of Holland.

A few days ago our reconnaissance aircraft reported a great movement of vehicles out of Holland. Then for the next few days there was no movement at all. The lines which bring the parts of the bombs from Germany into Holland have all, or nearly all, been cut. First they were repeatedly bombed by our aircraft, and then ground troops cut the lines permanently. For at least a week the Ministry of Home Security had no cases to report of enemy air action against southern England; and perhaps that infliction is now over for good and all, at least so far as sites in Holland are concerned. Air torpedoes may still be launched from other aircraft out in the North Sea; though that is a risky job for the crew of the parent machine. It is possible that rocket bombs may be launched from places in Germany, with an extended range. But in all forms of shooting, the longer the range the less chance of hitting. The longer range bombs may miss the island of Great Britain altogether.

"We are interrupting the news with an item of special interest. Last night our Mosquitoes did not bomb Berlin."

The Dutch people themselves will be very glad to see the end of the rocket bombs in their territory, not only because they injured their British Allies, but for their own sakes. Dutch civilians have told British correspondents that about 50 per cent. of the bombs used to fall a few miles from the launching sites, and caused widespread destruction. It has also been reported, though with what truth we cannot say, that defaulters in the German Army were sent to join the launching squads as a punishment, because the job was so very dangerous.

U-boat Developments

WHEN the Russians stormed the Polish port of Gdynia they captured intact over 40 U-boats. That was a very useful bit of work. It

WAR IN THE AIR

appears that since then the Germans have moved the centre of their U-boat manufacture back to Kiel, from which they moved it to Gdynia some time ago. One knows the really remarkable capacity the Germans possess for repairing bomb damage, and they may have got Kiel into some sort of shape again during its period of quiescence. So now the American Fortresses have been going to Kiel once again, and have aimed their bombs on U-boat yards there, doubtless with their customary precision.

The Admiralty has just announced that recently a convoy made its way through to Russia in the teeth of the most determined attacks from the air and from submarine and through a most terrific gale. All the ships got through safely, but there were losses on the return journey. Every U-boat captured or destroyed, in a pen or in the open sea, removes a definite danger to British seamen.

ON THE HOME GROUND : A Norwegian pilot led a strong force of rocket-firing Coastal Command Mosquitoes to attack an enemy ship in Dalsfiord. The ship was left in a sinking condition.

Petrol by Air

Transport aircraft have again been doing a great job of work. The great problem of our Generals in the West has been that of supply for their rapidly moving columns. Despite the destruction of railway bridges over the Rhine, American trucks have been supplying some 12,000 tons of supplies daily to the armour and other forward troops. But this did not include petrol. That all went by transport aircraft, and getting it up to the armour must have been dangerous work. The A.A. men of the *Luftwaffe* have been fighting with more determination than most of the German soldiers have lately displayed, and they are now very fine shots. Fortunately, a number of airfields have been captured, and the petrol has probably been landed on them. At any rate, shortage of fuel is not known to have held up any of the armoured columns which have been ramping so speedily across the Fatherland.

An interesting, but not now important, example of the Germans' skill and persistence in repair work has been found in the Eder dam, which is now in Allied hands. It is virtually intact. No sooner had it been breached by that very gallant attack by Lancasters two years ago than the Germans started work on repair, building large numbers of houses for the workmen. They kept the level of the water in it low to deceive, if possible, the interpreters of the photographs taken by our reconnaissance aircraft. But the British High Command had lost interest in the dam, and the repair work was allowed to proceed. Now that the Ruhr has been isolated, the dam can do no harm to the Allies. Production is of far less interest to our High Command than is distribution, and so oil and railway centres absorb most of the energies of Bomber Command.

Gen. Eisenhower has stated his opinion that there will be no clean-cut surrender of the German armies, and that V-Day will be signalised only by an Allied proclamation. Probably this will be followed by extensive "mopping-up" operations, which are likely to call for the employment of large numbers of troops. Allied air power should be able to prevent such operations from being unduly prolonged. German guerilla bands will have no outside friends to drop weapons to them by parachute, as the Maquis and other resistance movements had.

PHOTOGRAPHER PHOTOGRAPHED : This Fortress was shot down while on a special mission to photograph the landing of American airborne troops over the Rhine.

Japan at Her Last Gasp

Japan seems to have realised that she is at her last gasp. Gen. Koiso and his Cabinet have resigned *en masse*, and the aged Admiral Suzuki has been called from his retirement to become Prime Minister. In Japan a swing from Army to Navy in her politics usually means a diminution of the spirit of aggression. In general terms, her Army is usually pro-German in sympathy, while her Navy always retains a certain feeling of respect for Britain and her sea power.

Scarcely had the change of Govern-

WAR IN THE AIR

ment taken place than Mr. Molotov denounced the non-aggression treaty between the Soviet and Japan. Nominally it has still a year to run, but the step indicates Russia's conviction that she has all but finished with Germany, and can now turn her attention to helping her other Allies in the Far East and the Pacific. Britain and the U.S. are in good condition to look after the Pacific; but Russian help in clearing the Japanese out of China would be very welcome.

Japanese Naval Disaster

ONCE again a Japanese Admiral has done the wrong thing. Before this war the world used to think of Japan as a great naval Power. The name of Admiral Togo, who received his early training on H.M.S. *Worcester* off Greenhithe, and subsequently annihilated the Russian Baltic Fleet at the Battle of Tsushima, was one with which to conjure in naval circles all round the world. He is dead, and he has left no successor. Ever since the Americans began to resist the Japanese in the Pacific, the latter have made mistake after mistake, and met with disaster after disaster.

No doubt a great deal of the Japanese naval failings must be attributed to their inferior naval air power. When there was absolutely no air opposition, they scored heavily by sinking two British capital ships with torpedoes from the air. Ever since then the Japanese aircraft, whether land-based or ship-borne, have been routed by the Americans. The latter have used their bombers and torpedo-aircraft to attack the Japanese ships, and they have won a number of notable victories.

Last week the Japanese made a number of air attacks on the American fleets which have been lying off the islands round Japan, in the course of which they are stated to have lost hundreds of machines, without doing any damage that was of any consequence. Then, having thoroughly weakened themselves in the air, they sent out a fleet consisting of their last modern battleship, the *Yamato* (45,000 tons), two light cruisers and six destroyers. This fleet was pitifully weak for the task it was expected to do. It was promptly engaged by the aircraft of Vice-Admiral Mitchser's fast carrier force 60 miles south of the home island of Kyushu. The *Yamato* was hit by eight torpedoes dropped from U.S. aircraft and by eight rockets. She sank. After two hours only three Japanese destroyers were left afloat, and they turned and fled. The enemy had no aircraft up, and relied entirely on A.A. fire in great volume. It only succeeded in destroying seven American aircraft.

Admiral Lord Louis Mountbatten has announced that "the Japanese 15th Army has been decisively defeated and no longer exists as an effective fighting force." The remnants are trying to escape through the Shan States. Incidentally, the B.B.C. seems unaware that the letter A in Shan is pronounced (as in most languages other than English) long, giving the sound AH. So, perhaps, a landing at Rangoon may not be necessary after all. The land victory would have been impossible but for the wonderful feat of supply by air which has been carried out.

Berlin is now being bombed every night by Mosquitoes which start off from bases on the Continent. This makes a raid far less exhausting for the British crews.

END OF A GRUMMAN: A Fleet Air Arm Avenger about to end its career by plunging into the sea out of control.

ANGLE OF VIEW: A Boche attacking some 9th U.S.A.A.F. Marauders appears to be flying straight into a salvo of bombs. The photograph should of course be viewed with the bombs horizontal.

HERE AND THERE

Postponement

THE Royal Aeronautical Society debate originally fixed for Monday next, April 16th, has been postponed, but the new date had not been announced at the time of going to press.

Seconds Out

THE A.T.C. National Boxing Championship Finals will be held at the Royal Albert Hall on the evening of May 14th. This is the 3rd National Championship organised and controlled by members of the Corps, and among the trophies is one presented by *Flight*.

Spanish Soaring Record

SENOR LUIS VICENTE JUEZ, an instructor at the Huensca gliding school, recently set up a new Spanish duration record for sailplanes by remaining in the air for 30 hr. 57 min., beating his own previous record by 6 hr. 56 min.

France's First Duty

"OUR first duty is to build up a powerful air force; our second is to plan efficient and fast commercial air services," said the French Air Minister, M. Charles Tillon, at the recent opening of the French National Aviation Congress.

LONDON'S FORTRESS: The Lord Mayor of London, Sir Frank Alexander, christens a Flying Fortress of the U.S. 91st Bombardment Group, *Tower of London*, with a bottle of Thames River water. Sir Frank himself suggested the name.

London Airport Design

THE importance of starting right, and planning right, in creating what he described as "the staging posts of the future" was stressed by Sir William Hildred, Director-General of Civil Aviation, who officially opened the exhibition, in Piccadilly last week, of the prize-winning entries in the £650 competition for a design for an international airport for London organised by our contemporary, *The Aeroplane*.

In a brightly humorous, but never facetious speech, Sir William said it was very important that the air traveller should feel he was being properly cared for at the airport, and he contrasted this ideal state with an amusing description of his own daily experience at a certain railway station which he termed a "functional monstrosity."

Mr. R. E. Dangerfield, managing director of Temple Press, who took the chair, said that the chief idea behind the competition had been to focus general attention on the importance of airport design, and stressed the fact that the lay-outs exhibited had no reference to any specific site.

The winning design is illustrated on this page.

Vickers at War

SOME interesting items of information about the wartime activities of Vickers, Ltd., were given by the chairman, Mr. A. A. Jamieson, at the company's annual general meeting in London last week.

He mentioned, for instance, that the aircraft carriers *Illustrious*, *Victorious* and *Indomitable* had been built in their shipyards—a fact not generally known—and later added: "I am proud to tell you to-day that we have constructed over 28,000 new aircraft and repaired over 9,000 in addition.

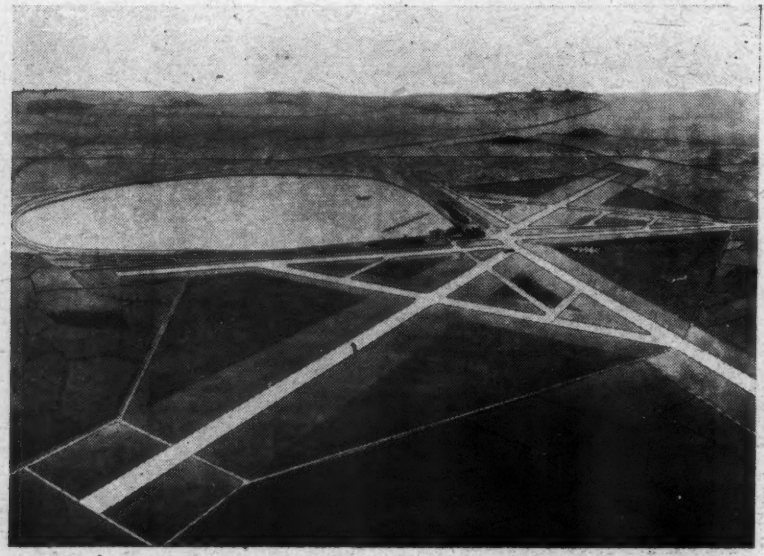
Blackburn Branch in Canada

ACCORDING to a report from Montreal last week, Mr. Norman Blackburn, who had then completed a two-months tour of U.S. and Canadian aircraft plants, stated that Blackburn Aircraft, Ltd., was "likely to establish a Canadian branch."

The company, he said, plans extensive production of transport aircraft after the war, and he and Sqn. Ldr. J. L. N. Bennett-Baggs, who accompanied him, expressed a preference for flying boats for very heavy aircraft.

Ten Thousand Good Japs

LT. GEN. C. KENNEY, commanding the Far East Air Force and Allied Air Forces in the south-west Pacific, stated at a recent Press conference held by the U.S. War Department in Washington that from September 1st last to the end of last month fliers of the U.S. Army and Navy had definitely shot down



THE WINNER: First prize of £500 in *The Aeroplane's* airport design competition (see paragraph above) is shared by H. J. Coates, A.R.I.B.A., of Bristol, Mr. E. R. Morgan, a B.O.A.C. engineer, of North Harrow, and Mr. F. W. Smith, A.R.I.B.A., a B.O.A.C. architect, of Bath.

HERE AND THERE

or destroyed on the ground at least 10,000 Japanese aircraft, not counting aircraft damaged and probably destroyed.

Saying that some 3,000 burnt-out and smashed Jap aircraft were counted on the ground in Luzon alone, Gen. Kenney added: "With negligible exceptions, the enemy's good aviators are all dead—nor has he competent mechanics to maintain his aircraft."

Unlucky Waghorns

MOST readers will remember that Flt. Lt. H. R. D. Waghorn, who won the 1929 Schneider Trophy Race, was unfortunately killed in a flying accident two years later.

Now his younger brother, Air Comdre. D. J. Waghorn, A.F.C., has also been killed in a flying accident at the age of 37, after coming safely through a period of service in the Fleet Air Arm at home and in the Mediterranean.

Air Comdre. Waghorn transferred to the Central Flying School as an instructor after serving in the F.A.A., and later was posted to instructional duties in Egypt. Last August he was appointed A.O.C. the Photographic Reconnaissance Group of Coastal Command.

One of the Higher Ups!

RECORDING a coast-to-coast non-stop flight record of 6 hr. 3 min. 50 sec. by a C-97 transport flying from Seattle to Washington (this represents an average of 383 m.p.h. for 2,323 miles), the February 1st issue of *Western Flying* adds that the flight "was made at an altitude of 300,000ft. with a payload of 20,000 lb."

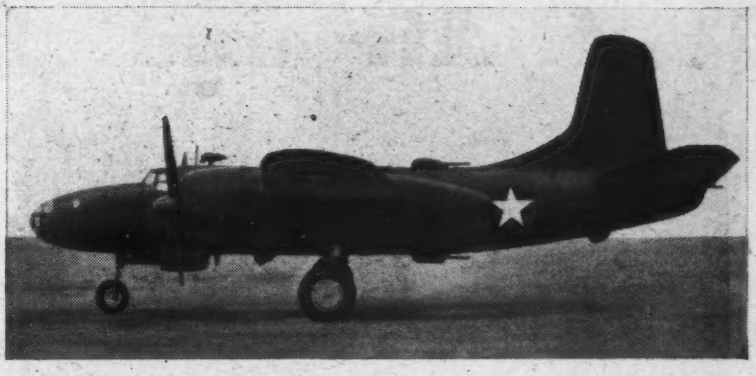
Evidently the pilot was taking no chances of colliding with a V2.

American Development

RECENTLY published pictures of the Grumman Avenger and Hellcat have shown both aircraft with a large bulge, faired on to the starboard wing. This bulge possibly houses some form of Radar.

A Curtiss Warhawk and a Lockheed Lightning are two aircraft known to have been fitted with large fully retracting skis.

Some U.S. Navy air/sea rescue Catalinas (popularly known as Dumboes) carry a small lifeboat of 1,500 lb. under the port wing.



EXPERIMENTAL: The North American XB-28, a medium bomber first flown in 1942, fitted with some of the first remotely-controlled gun-turrets as used on the B-29. It bears a striking resemblance to the Douglas A-26 Invader.

P-38's Latest Role

LOCKHEED Lightnings fitted with an aluminium alloy nose incorporating a bombardier-navigator's compartment with Plexiglass glazing have been in operation as high-altitude precision bombers in the European theatre for some time, it was officially disclosed at U.S. Eighth Air Force H.Q. last week.

Col. Hough, now director of the "Eighth's" technical section, said that the alloy nose is easily interchangeable with other types, and added that this version of the Lightning could bomb accurately at speeds 50 per cent. faster than that of their heavy bombers, and they needed no additional fighter protection.

R.Ae.C. Finance

ANOTHER considerable improvement in the accounts for the year were reported by Lord Gorell when he presided at the recent annual general meeting of the Royal Aero Club. They had been able to set aside £1,500 towards renewals and repairs which, added to the £1,000 set aside last year, created a reserve of £2,500 for this purpose.

In addition, they had made the full provision of £1,250 for debenture redemption and £1,419 for the writing-down of the lease—a total of £4,169 set aside during the year. And after making all these provisions the accounts for the year still showed a surplus of £501.

This satisfactory result, Lord Gorell added, was mainly due to the increase in subscription income and to the maintenance of turnover in the House Department in spite of enemy attempts to discourage the use of the club by bombs, doodle-bugs and rockets. Membership of the club was now 1,450, many of whom were serving in the Forces.

Elected Officers

THE following R.Ae.C. officers were elected at the meeting for the year 1945-46:—

PRESIDENT: Lord Brabazon of Tara, M.C., P.C.
VICE-PRESIDENTS: The Duke of Sutherland, K.T.; The Marquess of Londonderry, K.G., P.C., M.V.O.; Lord Gorell, C.B.E., M.C.; Captain Sir Geoffrey de Havilland, O.B.E.; Lt. Col. Sir Francis K. McClean, A.F.C.; Sir Frederick Handley Page, C.B.E.
COMMITTEE: Capt. K. J. G. Bartlett; Capt. H. S. Broad; Grp. Capt. C. Clarkson; S. Kenneth Davies; Col. W. C. Devereux; Sir Lindsay Everard, M.P.; Cdr. Francis Francis; Cdr. (A) A. Goodfellow, R.N.V.R.; Capt. A. G. Lamplugh; Air Chief Marshal Sir Arthur M. Longmore, G.C.B., D.S.O.; Maj. R. H. Mayo, O.B.E.; H. W. H. Moore; Maj. H. A. Petre, D.S.O., M.C.; Col. R. L. Preston; Air Comdre. H. M. Probyn, C.B., C.B.E., D.S.O.; Maj. J. Stewart, O.B.E.; Mr. G. H. Wilson-Fox; Mr. Frank Woodhead.

Trade Announcements

MAJ. C. M. CARINGTON, M.C., who for many years has been director and general manager of K.L.G. Sparking Plugs, Ltd., has joined the board of S. Smith and Sons (England), Ltd.

* * *

Mr. R. Stammers, who has been general manager of Rotol, Ltd., since the formation of the company in 1937, is relinquishing his position at the end of April this year. Prior to the formation of Rotol, Ltd., Mr. Stammers was associated for a considerable period with the engine department of the Bristol Aeroplane Co., Ltd.

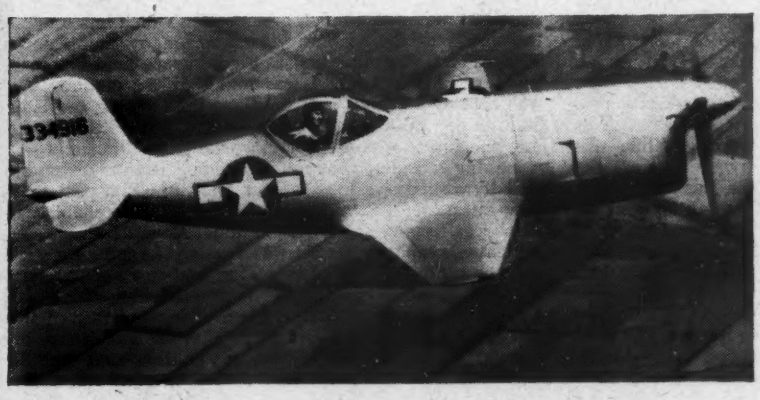
* * *

Ferodo, Ltd., announce that they have now secured new Manchester premises at 53-55, Fennel Street, more convenient to customers than those at Chorlton-on-Medlock. The telephone number is Blackfriars 0663/4.

* * *

The London sales office of I.C.I. Leathercloth Division ("Rexine") was transferred on April 1st to their southern region office at Belmont, The Ridgeway, Mill Hill, London, N.W.7.

D



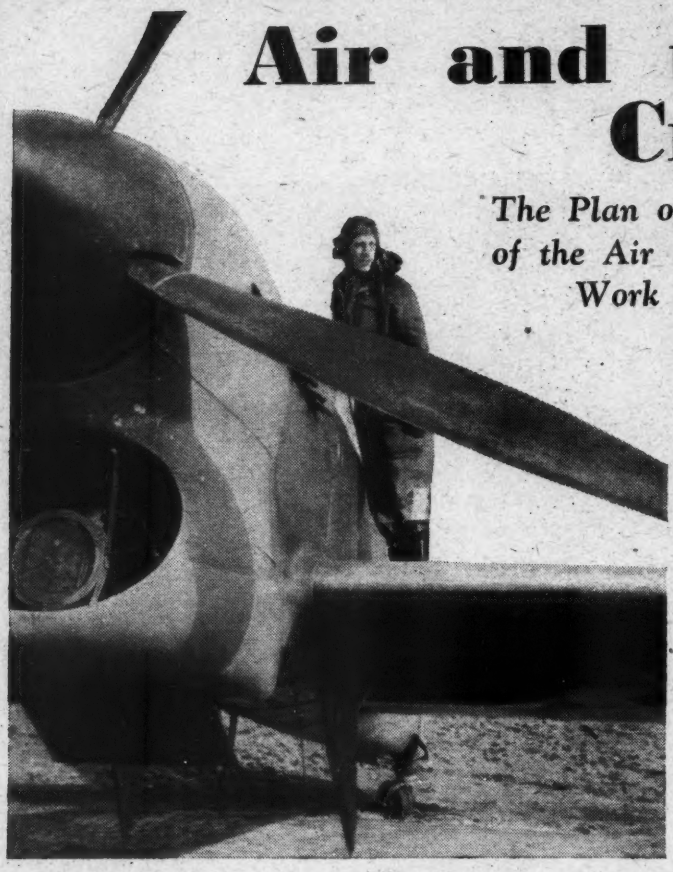
SMALL AND SNAPPY: The Bell XP-77 all-wood fighter with a span of only 27ft. 6in. is powered by a 450 h.p. air-cooled 12-cyl. inverted V-type Ranger and carries two 0.5in. machine guns and one cannon. Very great manoeuvrability and finger-tip control are claimed for it.

Air and the Rhine Crossing

The Plan of Campaign : More Details of the Air Forces' Contributions : The Work of the Fighter-Bombers

By JOHN YOXALL

OUR War Correspondent has now returned from a tour of the 2nd Tactical Air Force on the Continent. In addition to watching the air operations involved in the actual Rhine crossing, he visited typical units and learnt from them their share in the great air effort which made the crossing possible. This article is the first of a series of three which will deal with various aspects of this subject.



TEMPEST PILOT, Sgt. Brown, who was fortunate enough to damage an Fw. 190 on his second operational flight.

TO those few of us who were privileged to know the plan of campaign for crossing the Rhine on that eventful Friday-Saturday night of March 23rd-24th, it has been a great delight to see the whole affair work out so perfectly. It has, in fact, gone rather ahead of time-table.

The plan for the British Army front was essentially simple. Under cover of a smoke screen, which the exceptionally gentle weather of March allowed us to keep in being for many days, the infantry were almost entirely withdrawn from the front line, and an enormous concentration of guns moved up to very forward positions. There were over 1,000 of them of all calibres.

At 5.30 p.m. on the afternoon of the 23rd it was Bomber Command's job to blot out life in the outskirts of Wesel. Immediately this air raid was over, the guns started their barrage—firing a large proportion of air-burst shells to destroy the 88 mm. guns which the Germans use both as anti-aircraft guns and as ordinary artillery. While this barrage was going on the Commandoes were to cross the Rhine at 9.30 p.m and take up their positions some 1,200 yd. from Wesel. At 10.30 p.m. the plan allowed for the barrage to stop for a period while Bomber Command Lancasters paid a second visit to Wesel—400 aircraft were employed in the two attacks. Directly the last bomb had exploded, the Commandoes were to attack Wesel, while the few remaining Germans were still bomb-happy. During the night other troops were to cross the Rhine at various points, and the artillery barrage was to continue with its counter-battery programme.

At precisely 10.30 a.m. on the morning of the 24th the barrage was to stop firing along an alley wide enough to allow the approach and landing of the 6th British Airborne Division and the 17th American Airborne Division on the high ground north-east of Wesel. Re-supply was to be flown-in immediately, before the Germans were able to concentrate any considerable numbers of anti-aircraft guns.

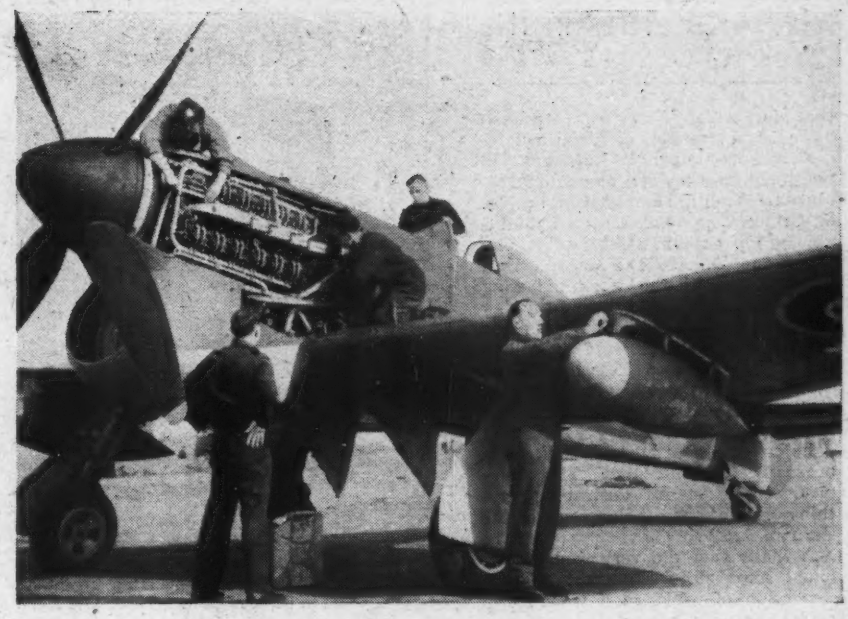
While the barrage was lifted to allow the landing to proceed, the counter-battery work was to be by fighter-bombers of 2nd T.A.F. Many of the Typhoons were to use rockets for this purpose. The British Division had to fly from England protected by Fighter Command aircraft. The Americans came from somewhere in France and were looked after by fighters of the 9th U.S.A.A.F. The two streams joined at Wavre. East of the Rhine, for a depth of some 50 miles, No. 83 Group of the R.A.F. and the fighters of the American 29th Tactical Air Force were given the job of keeping the sky clear of enemy aircraft. Beyond that again, as an extra precaution, the long-range fighters of the 8th U.S.A.A.F. covered the *Luftwaffe* airfields which, the previous day, had been pounded with 1,400 tons of bombs by 8th Air Force heavies. All the ground forces were to be directed by Field Marshal Sir Bernard Montgomery, and Air Marshal Sir Arthur Coningham was to co-ordinate and direct the entire air effort.

Planning Ahead

Everything worked like a charm, and we are now witnessing later phases of a much greater plan which has occupied the minds of the planning staffs for many months past. It comes to mind now that at a conference held before the invasion of Normandy I was told that the planning staff was already working out the plans for crossing the Rhine and fighting in Central Germany. At that time this glimpse into the future savoured of unwarranted optimism.

Having considered the immediate operation and seen how well it worked, we must go far back into the past to see how air power has contributed and, in fact, enabled the plan ever to come to the operational stage at all.

Heavy bombers have been weakening Germany for years, and the ultimate stage of this effort has now been reached. Because of this widespread heavy bombing the enemy have—with all their Teuton thoroughness—dispersed their war industries far and wide. As the air attack has progressed the fact has gradually crystallised that we have concentrated on the common denominator of all war effort—that is to say, transportation. As a double check we have concentrated also on oil, which is the essential factor where transport is concerned How effective this has been can be judged by the fact that German oil production is now



SOME POWER UP ITS SLEEVE : Attending to the Napier Sabre and the port drop-tank of an 83-Group Tempest.

down to less than 10 per cent. of the pre-raid production, and only one-quarter of the oil considered necessary for the enemy armed forces alone a year ago now has to suffice the needs of the whole of Germany.

The policy of dispersal of war factories has recoiled against the Germans. It is but little use building factories a long way from the Ruhr if air interdiction will not allow coal and steel to reach them. Neither is it much use producing tanks, guns and all the other paraphernalia of modern warfare if there is no transport to take them to the fighting lines, and no petrol or oil to operate them even if they do get there.

Germany's own mishandling of air power—treating it as a servant of the army, and putting it under the control of army generals—has reacted to our benefit. They never built a strategic bomber force, and even on the tactical side they never realised that air power was a weapon to be handled only by men who had made a life's study of its employment.

Properly handled, as the R.A.F. has been, air power offers enormous dividends in saving the army from overwhelming casualties on the battlefield. The capture of Wesel cost the Army 90 casualties; without air support it might easily have cost 3,000 lives alone. The Germans have lost nearly six million men killed or permanently maimed. That is to say over one-half of that proud *Wehrmacht* which threw down the gauntlet with so much boasting in 1939. Despite the fact that—apart from Germany—we have been at war longer than anyone else, we shall finish the struggle with the major portion of the best of our manhood intact.

The price paid for this conservation of life is a number of killed and missing airmen, equal to nearly double the present strength of the 2nd T.A.F. It would be well if this great fact were realised by the country at large.

From the large overall picture, let us turn to a more detailed survey. It would require a very thick book to record even the most sketchy outline of the activities of 2nd T.A.F., but a fairly clear picture can be got by visiting typical units, as I did. The difficulty is to know where to start. Whether to describe the work of reconnaissance wings first, or to give precedence to the fighters or bombers. One must start somewhere, so it would be as well to begin with the fighter boys who do a little of everything except

GONE TO THE WALL : A souvenir Nazi flag decorates the wall of an 83-Group crew room

AIR AND THE RHINE CROSSING

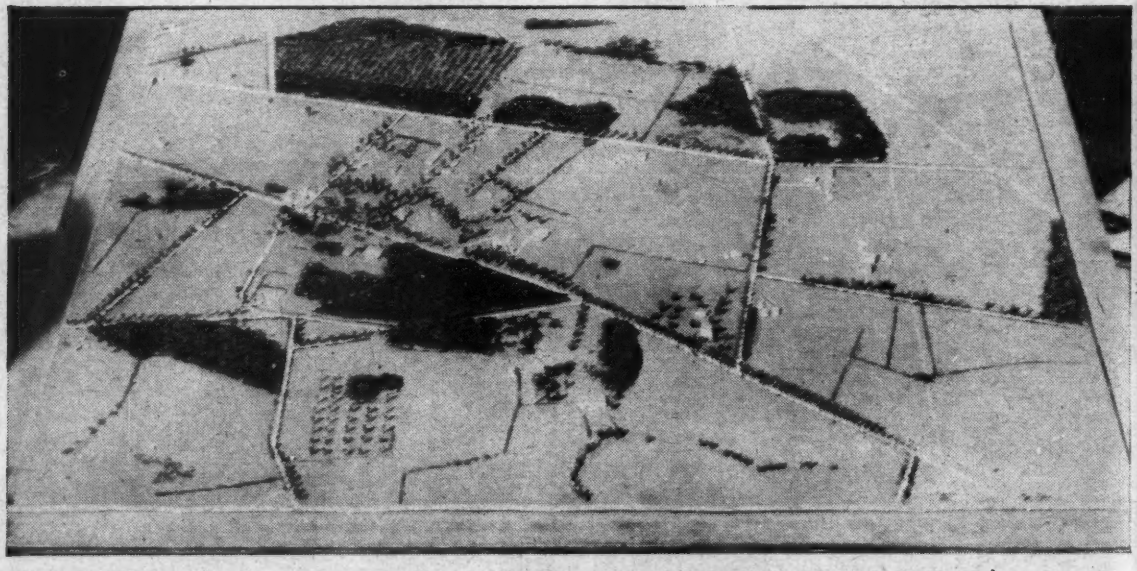
that for which they were trained. They bomb, rocket, or do armed reconnaissance, but if the *Luftwaffe* will not come up, they can do no air fighting. I visited a Tempest wing of No. 83 Group, commanded by a redoubtable group captain fighter pilot who wears the D.S.O., D.F.C. and Bar. He told me of the work his wing had put in before and during the day of the Rhine crossing. During the show the Tempests were patrolling the bridges between Rees and Wesel at 5,000ft. for some 45 minutes of each patrol, and as they were relieved by the next aircraft they went off in pairs to do an armed recce. for another quarter of an hour. This really means going in and destroying anything or anybody belonging to the German Army.

Actually they did very well. They found some motor transport; a concentration of tanks in a wood; two petrol bowsers towed by a tank; several despatch riders; a staff car with pennant flying; a lot of horse-drawn transport, and a lorry towing a gun. All these received attention from the Tempests' 20 mm. cannon, but for the tank concentration the Tempests called up their Typhoon brothers to do a bit of rocketeering. In normal times they operate farther afield "clobbering," as they call it, locomotives and trains on the main lines between Berlin and the front. As a result of their efforts, it is known that the engine drivers have petitioned for more protective armour plate.

The keenness of these boys in the sixth year of war is unbelievable. With great relish I was told how they found an elaborately-camouflaged oil refinery and storage tank, and kept it to themselves until they had "clobbered" it. Apparently there were nine or ten storage tanks, three or four of which were as much as 130ft. across. One squadron of Tempests attacked in the morning and, when a second squadron attacked in the afternoon, they saw the smoke 50 miles away. Typhoons went in the next day and found it still burning. Finally 77 Forts were put on with fighter escort and, after the show, this escort went round shooting-up trains of oil tankers. When ammunition ran out they finished up by taking cine films of the fire.

At the Rhine crossing the Tempests were used in a close-support rôle for the first time. Their prentice hands were called in by ground control to winkle out some enemy troops who had dug themselves in on a railway embankment. One New Zealand squadron leader, recently flying Tempests, landed with the airborne troops in a glider to establish a forward control post, and another squadron leader—on rest—went over the Rhine with the first assault troops in an amphibious tank, for the same purpose. The Tempest boys were very upset because the Forts had the job of looking after the *Luftwaffe* airfields.

PORTAL BUILDING: Housing is an urgent necessity on forward airfields as well as in bombed cities. This one was not designed by the C.A.S.



IDENTIFICATION AID: The 1in. to 52 yards scale model used to brief No. 84 Group Typhoon pilots for their raid on the headquarters of Gen. Blaskowitz and Gen. Christiansen in Holland.

AIR AND THE RHINE CROSSING

Their operation reports are a joy to read. Here are some quotations—"Caught a Me 262 trying to do a photo. recce. of the Wesel bridgehead on the day after the crossing. It never got near the Rhine." "Shot down an Fw 190 yesterday when *Luftwaffe* were incautious enough to make a rare error of judgment and fly into a piece of air already occupied by Tempests of 2nd T.A.F." "On patrol to keep the *Luftwaffe* ground-borne." In the last six months this wing alone has destroyed 200 M.T., 136 aircraft, 61 locos., 2 barges and 63 trucks. Thousands of others have been damaged. The wing lost 61 pilots during this period.

From the Tempest wing I moved on to the H.Q. of No. 84 Group, which is commanded by Air Vice-Marshal E. C. Hudleston, C.B., C.B.E., who was closely concerned with the landings in Sicily, Salerno, Anzio and Southern France. He is one of the first complete products of the R.A.F. to reach High Command. He passed through the R.A.F. College at Cranwell and, strangely enough, Sir Arthur Coningham, now A.O.C.-in-C. 2nd T.A.F., was then an instructor at the College. The group's job on the day of the crossing was to do anti-flak work for the airborne division, and to see no reinforcements were fetched in from Holland or the North. Previous to this the group had worked with Fighter Command on an extensive interdiction programme to cut off the V1 and V2 sites in Holland from their supplies. It was their work which relieved Antwerp from continuous bombardment and allowed supplies to come through for the build-up.

Aircraft of this group have attacked all sorts of enemy headquarters from Corps H.Q. down to Company H.Q. It was this group that blasted the H.Q. of Gen. Christiansen at Zutphen. For this attack the Army Camouflage Unit made a model of the target area to a scale of one inch to 52yd. This model was used for training, briefing and de-briefing. The pilots of a wing of this group did tremendous anti-flak work for the airborne people. They claim 56 A.A. guns of all calibres put out of action, and, what is probably as important, they drew the fire or temporarily silenced the fire of many others.

The group captain of this wing described the scene of the airborne landing as he saw it close up. "It was," he said, "like a fantastic set-piece at a Hendon display." Coloured chutes covered the ground in all directions; aircraft were going down afire; fighters were attacking flak positions, rockets were criss-crossing in all directions, and a smoke pall and haze covered all." He also said he had never seen such flak. At 10 o'clock when the barrage lifted there was no flak; by 10.15 a.m. it was very intense; by 10.30 a.m. it had subsided a great deal.

The work of No. 2 Group will be described in our next issue.

"LIKE THE GENTLE RAIN FROM HEAVEN": Droves of paratroopers landing in the Rees-Wesel area. The Fortress from which this photograph was taken was later shot down.

FÉDÉRATION AÉRONAUTIQUE INTERNATIONALE

HAROLD PERRIN, the secretary of the Royal Aero Club, has recently been over to Paris and met the Bureau of the Fédération Aéronautique Internationale, and discussed details for the resumption of the activities of the Federation as soon as is practicable.

Unfortunately, he was met with the news that the secretary general of the Federation, M. Paul Tissandier, had died the day before his arrival. M. Tissandier had been associated with the Federation since its inception in 1905, and had rendered a great service to international aviation. He was mainly responsible for the introduction of the customs carnet for international travel by private aircraft, which was a great boon to our air tourists.

In spite of the German occupation, all the records and archives of the Federation are intact.

SUCCESS OF FAIREY AIRCRAFT

SOME figures indicating the important part played by Swordfish and Albacore aircraft in the Mediterranean area were given by Mr. Maurice E. A. Wright, A.F.C., F.R.Ae.S., when he presided over the adjourned sixteenth annual general meeting of the Fairey Aviation Co., Ltd., in London last week.

With a striking force, based on Malta, of never more than 20 aircraft at any one time, he said, these two types sank or damaged more than 250,000 tons of shipping vital to the enemy's African campaigns. Operating entirely at night in the critical year of 1942 preceding El Alamein, 160,000 tons of enemy shipping was sunk or badly damaged in 36 torpedo attacks.

These figures, Mr. Wright added, related only to a small part of the full story, but nevertheless they indicated the rich dividends paid in war successes by aircraft designed and built by their company for service with the Royal Navy.

Details of the Barracuda and Firefly had, he reminded the meeting, been released during the past year, and it was a year ago to the day that the former had first come into the news with its attack on the *Tirpitz*, to be followed during the same month by a devastating attack at Sabang on the other side of the world. The Firefly had also made an excellent début on both sides of the world. Very large numbers of Barracudas had gone into service, and the company's aircraft were to be found in the 40 escort carriers and the large Fleet carriers which were having such a mounting influence in the Royal Navy. The company was keeping fully abreast of the latest technical developments and was in a sound and strong position to meet the demands of the future.

OFF TO CUBA

MR. E. L. GANDAR DOWER, managing director of Allied Airways, and one of the leaders of the group of independent airline operators, has left this country to attend the International Air Operators' Conference at Havana. He will represent The Association of British Aircraft Operators.

"FLIGHT" INDEX

THE *Flight* index for July-December, 1944, is now ready at 1s. or 1s. 1½d. by post, or with cloth binding-case at 4s. 6d. or 4s. 10d. by post. Readers' copies can be bound at an inclusive cost of 13s. 3d., but present circumstances will occasion some little delay in the execution of such orders.

ON JETS AND TURBINES

MORE ABOUT THE LOCKHEED "SHOOTING STAR" AND THE BELL "AIRACOMET" : PROPOSED TURBINE DRIVEN PRIVATE PLANE : A SIMPLE EXPOSITION OF THRUST POWER

By G. GEOFFREY SMITH

MORE details of the Lockheed P-80 have been released in material issued by the U.S. Army Air Corps, G.E.C., and the Lockheed Co. The "Shooting Star," as it is termed, is the latest American jet fighter credited with a very high performance, faster than the tailless Me 163 rocket-propelled interceptor. Some details appeared in *Flight* of March 8th last. It is clear that much of the superior performance of the P-80 can be ascribed to the exceptional aerodynamic qualities of the airframe structure, which has been a special study of Clarence L. Johnson, chief research engineer of the Lockheed Co. It has a modified type of wing with a knife-like leading edge. On each side of the fuselage, just forward of the leading edge and almost flush against the fuselage, are streamlined air-intake ducts leading to the compressor. The turbine efflux issues from the tail and is not heard by the pilot. The cockpit it located forward of the wing, and the slender lines of the nose give splendid visibility for combat manœuvres, including ground strafing. A bubble-type canopy is used, and special consideration has been given to pilot comfort. Unique among fighters in the production stage is the pressurised cabin, which suits it particularly for flying at altitude where efficiency is greatest. Its ceiling is higher than that of screw-propelled planes. Light weight and small compass are especially stressed, and the wing loading is less than that of an average fighter. One of the great advantages which has been urged in previous notes is the small size and light weight of a turbine-compressor unit, which permits the aircraft structure to be scaled-down in dimensions—"tailor-made" is the expression I adopted years ago —to achieve all the benefits possible in reducing drag. The ever-present problem of head resistance assumes added importance in aircraft designed for ultra high speeds. By dispensing with the airscrew, radiator, oil-cooling system, superchargers, carburettor, and the complex controls of orthodox aircraft, and the use of lighter landing gear, the design can be considerably lightened and cleaned up externally. Servicing and maintenance are minimised on this account. The sleek "Shooting Star" is lacquered to a high polish, and therefore offers the minimum of air resistance. Four Lockheed factories and the Kansas City factory of North American Aviation, manufacturers of the Mustang, are at work on this new jet fighter.

As already mentioned, the prototype of the P-80 had a turbine jet propulsion unit produced by the de Havilland Co. under Whittle basic patents, similar to that fitted in the recently announced de Havilland jet fighter. The production-type power unit was developed from this by G.E.C. at their Lynn works. It is now in quantity production at the General Electric Co.'s works at Syracuse, N.Y., and the Allison Division of General Motors. No figure of thrust h.p. has yet been released, but it is announced that the unit produces more than twice the power of the earlier jet units in the Bell Airacomet, and is far more powerful than any conventional reciprocating engine for aircraft. Tests have been made in air as cold as 76 degrees below zero. A feature is that the engine unit can be replaced completely in 15 minutes.

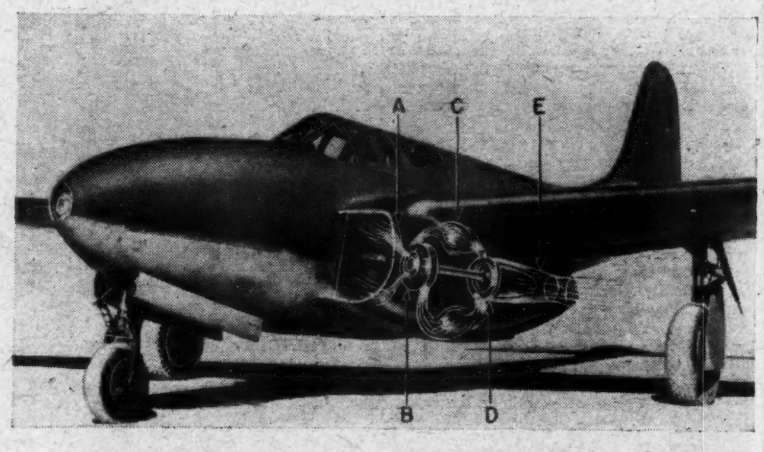
While in America last autumn, I visited Los Angeles and met Mr. Clarence Johnson, whose brilliant work had been mentioned to me on several occasions. He and his company are to be congratulated on the "Shooting Star" and the advance it represents in jet fighter design, as well as their celerity in production. Engineers of the Pacific coast are greatly impressed by the simplicity of design and controls, smoothness of operation, easy servicing and comparative silence of jet-propelled craft. That the turbine jet unit requires no warming up, develops enough power for take-off in less than a minute and uses "safe" fuel, are features particularly appreciated.

The Airacomet Trainer

Such has been the progress with jet planes that the P-59A Bell Airacomet, which was widely publicised in U.S.A. last year, is to-day classed as a trainer. It is powered by two G.E.C.-Whittle turbine-compressor units designed to fit snugly against the fuselage under the wings. A sketch superimposed on a photo of the Airacomet has been issued by the G.E. Co. to show how the units are applied. On each side the air intake A is located at the leading edge of the wing, and the jet nozzle terminates just rearward of the trailing edge. The compressor is shown at B, and in the blast chamber C fuel (either gasoline or kerosene) is injected into the compressed air, ignited, and the temperature raised, which causes expansion. The turbine D is rotated at high speed by the escaping air-gas stream, and in turn gives power to the air compressor on the front of the shaft. Through the nozzle E the exhaust emerges as a high-velocity jet which by reaction drives the plane forward.

An Adverse Comment

Not all American engineers are convinced of the future of jet propulsion. For example, in a technical examination of jet-propulsion possibilities



The P-59A American Airacomet has two turbine engines designed to fit snugly against the fuselage, under the wings. Air flows into the intake (A) and is compressed in (B). The compressed air goes into blast chamber (C). Turbine (D) is propelled by the gas-air stream on its way to the exit nozzle (E).

issued in a 46-page pamphlet at $1 and embodying formula on the force of the jet, jet velocities and nozzle design, the writer, Thomas N. Dalton, sums up with the following astounding remarks under "Potentialities and Prospects."

"Some people have written that jet propulsion is powerful and efficient. Quite the opposite is true. It is inefficient and is weak. This trouble stems from basic causes that are unchangeable, and no amount of 'refinement of design' or 'investigation' can overcome the stumbling blocks.

"The prospect of jet-propulsion systems replacing the present engines in aircraft, *per se*, is not admitted as a remote possibility, even among the most ardent exponents of jet propulsion. . . .

"The application of the gas turbine to a jet-propulsion system is just so much confusion confounded. In this case it is no wonder that the British experts freely admit that their jet aircraft that is in production by the Bell Aircraft, the one originally developed by Air Commodore Frank Whittle, of the R.A.F., the one that has the General Electric gas turbine, has a high fuel consumption. In the opinion of the author, the use of the word 'high' in describing the fuel consumption is, if the facts were known, a veritable symbolism of understatement. A better word would be 'horrible.'"

But this is not typical. In general, aircraft engineers have tackled research and development of gas turbine power units with energy and zeal, encouraged by the U.S. Army Air Corps and the U.S. Navy. No less enthusiastically are aircraft designers and technicians applying their skill to the production of airframe structures to receive turbines. Their designs will incorporate features which will enable the maximum benefit to be derived from the small, compact power unit that the turbine/compressor represents.

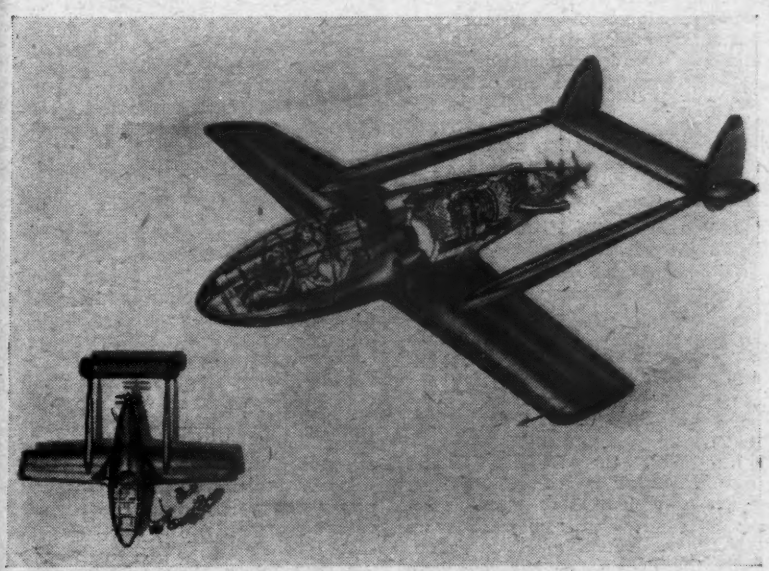
A Jet-propelled Private Plane

American aviation and engineering journals have been very prominent with turbine jet propulsion subjects of late. Flight without the aid of an airscrew has captured the public imagination. Nearly all the prominence has been accorded to jet propulsion proper; few have yet appreciated that the gas turbine is the significant development. As a prime mover in conjunction with small multi-blade airscrews it offers advantages at normal flying altitudes which enable it to score over jet propulsion proper. Discussing the subject with Mr. Leslie Neville, Editor of *Aviation*, I was invited to expound this angle in an article which appeared in the December issue of his journal. Subsequently Mr. Gil Paust, Aviation Editor of *Mechanix Illustrated*, asked for my views on turbines and jets for civil aircraft. Under the heading "Is Jet Propulsion the Answer?" I showed a possible course of development with contra-rotating airscrews—say two, each with five blades, driven by a slow-running gas turbine. An extract from the notes which appeared in the journal named for March is appended, together with a reproduction of an artist's sketch which was worked up from a rough pencil sketch of mine on the back of a menu card. The suggestion was for a private four-seater aircraft of the future with a tiny gas turbine running at, say, 6,000 r.p.m. driving contra-rotating airscrews of small diameter at 3,000 r.p.m., requiring only a 2:1 reduction gear. The airscrews might conceivably be small enough to be shrouded.

"The gas turbine can and will be readily modified from jet propulsion to constitute a smooth-running unit, developing mechanical power from the single shaft on which the compressor and turbine revolve. In aircraft, for example, we may apply an airscrew or probably contra-rotating airscrews of small diameter which give an immediate benefit. It is known that jet-propelled craft do not take off rapidly nor is the angle of climb outstanding until speed is attained. The reason is that jet propulsion is at its lowest efficiency at low altitudes and low speeds. Efficiency rises as the speed increases and altitude is attained. Why, it may be asked, is this the case? The answer is that cold air entering the compressor is beneficial when the upper regions are attained, the reduced density of air creates less resistance or drag, and back pressure is reduced on the jet efflux. Furthermore, as the speed of the aircraft rises, more air is scooped into the air inlets by ram effect. Remember the efficiency of a jet-propelled aircraft is largely governed by the mass of air passing through the power plant; enormous quantities are necessary for maximum results. Additionally, the relatively small compact unit submerged in the wing or fuselage enables us to "tailor make" aircraft to suit, that is, to reduce drag by evolving designs of exceptional aerodynamic efficiency—a contributory benefit of the highest importance.

"Now if we apply airscrews to the turbine shaft, preferably, it is suggested, of the 'pusher' type at the back, we retrieve the ability to take off quickly and to climb speedily, increase all round efficiency and attain prodigious speeds at the present normal flying altitudes.

"Alternatively, if, as many believe, our future long-distance airliners operate regularly in the stratosphere with pressurised passenger cabins simulating low-altitude conditions, and at speeds between 500 and 600 m.p.h., power will be derived from a combination series of gas turbines producing propulsive jets and also driving airscrews."



A suggested form of three- or four-seater private plane driven by a gas turbine unit with small contra-rotating propellors.

A Simple Explanation of Thrust Power

Mr. Hall Hibbard, Chief Engineer of the Lockheed Aircraft Corporation, with whom I enjoyed a most interesting talk on aircraft and engines over lunch in Los Angeles, has sent me a copy of some interesting notes in popular vein in an attempt to straighten out general misconceptions about jet propulsion. They are entitled "The Thrust Power of the 'Shooting Star'" and are reproduced here.

"Perhaps the most common misconception concerning the principle of jet propulsion is the idea that forward thrust is obtained by the rush of hot gases from the jet pushing against a cushion of air. This is not true.

I think the simplest way to visualise

ON JETS AND TURBINES

the theory of jet propulsion is this: Let's suppose we have a metal sphere filled with common illuminating gas. By means of a sparkplug we ignite the gas. The result is an explosion with tremendous pressure exerted equally against all points on the sphere. But because the pressure is equal at all points on the sphere, the sphere itself will not move as a result of the explosion. The pressure on one side of the sphere is cancelled out by opposite pressure on the other side.

Now let's make a hole in the sphere and repeat the same performance. There will be pressure at all points on the sphere's interior surface except at the hole, where the gases will have nothing to press on and will escape. Thus you have all of the forces created cancelled, as before, except those acting on the surface of the sphere directly opposite the hole area. Here there is positive pressure on one side of the sphere where there is no opening. On the other side, where the gases are able to escape, the pressure is zero. The result is obvious, the sphere will move in the direction of the positive pressure—away from the opening.

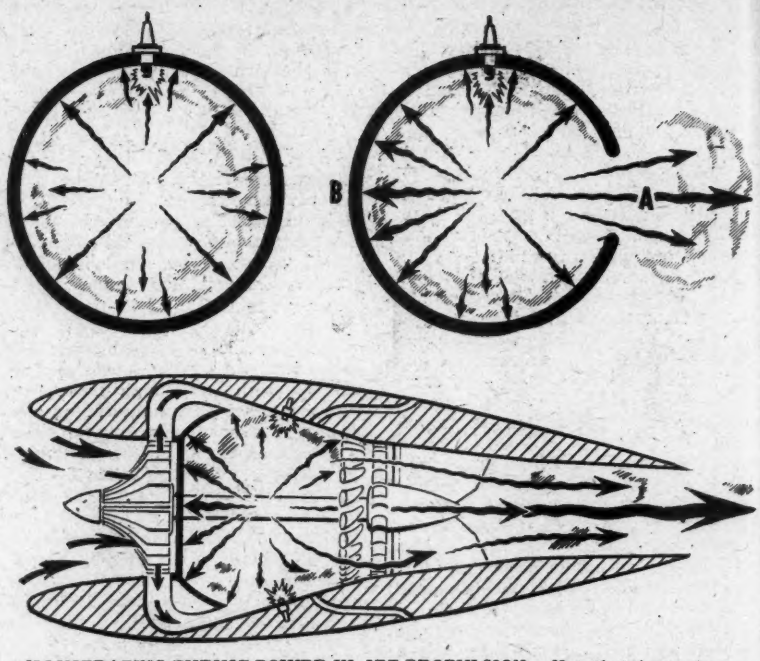
This is simply a matter of internal pressures in the sphere. Nothing outside the sphere has any bearing on what happens to the sphere. It works as well in a vacuum as in the earth's atmosphere. This is the principle of jet propulsion.

How the Unit Operates

A jet engine, such as that used in the Lockheed P-80 Shooting Star, is really very simple. Streamlined ducts in the leading-edge of the wings lead air to the engine, where a high-speed fan draws the air into the engine at high compression. From the compressor the air passes into a combustion chamber, where it is mixed with fuel injected at high pressure. A continuous explosion occurs in this combustion chamber, heating the gases to a very high temperature and causing them to expand violently.

Now we have a condition similar to that created in the sphere with the opening on one side. The exploded mixture under great pressure can only move in one direction, toward the back of the aircraft. Thus we have zero pressure towards the rear, equal pressures cancelled out on the sides, and a positive forward pressure at the front of the combustion chamber. No valves are needed as the new air being piled in by the fan prevents air escaping towards the front.

You will remember from your high school physics the formula for determining force (F=MA or Force equals Mass times Acceleration). This law applies to jet propulsion. "F" (the force driving the aircraft forward) is equal to "M" (the mass of the expanding gas) times "A" (the acceleration given the gas as it expands and passes to the rear). In jet engines we speak of thrust rather than horse-power and the power of an engine is expressed in pounds of thrust.



ILLUSTRATING THRUST POWER IN JET PROPULSION: Note that the combustion creates equal forces at all points on a sphere's inner surface. By making an opening A the gases escape and sphere moves toward uncancelled pressure at B. In the lower illustration, the expanding gases in combustion chamber flow through turbine to exhaust. At the exit nozzle the gases have dropped to atmospheric pressure, whilst the positive forward pressure provides thrust.

Once the engine is started no ignition system is necessary. A small metal plug protruding into the combustion chamber heats red hot in the first few seconds of operation. This serves to ignite the mixture of air and fuel as it is introduced. For the initial start sparkplugs are used.

From the combustion chamber the hot gases pass rearward through a gas turbine. Here is the heart of your jet engine. This turbine turns very rapidly under the impact of the rapidly expanding heated gases. A shaft connects the turbine to the compressor fan in front of the engine supplying the power necessary for the intake and compression of the air. In effect you are lifting yourself by your own boot-straps.

A 'Safe' Fuel Used

For fuel, the Shooting Star's General Electric engine uses kerosene, which is preferable to gasoline because it provides somewhat more B.T.U. per pound and per gallon. Thus the dangers of handling high octane gas are eliminated. Absence of an airscrew removes another hazard, although the hot gases issuing from the tail at about 1,200 deg. could be dangerous. However, these gases cool rapidly, and 100ft. behind the aircraft only a strong blast would be felt."

Looking to the future Mr. Hibbard says:—

"It is hard to forecast the limits of future developments in this field. In my opinion jet engines can be used successfully by large aircraft as by small. I can foresee tremendous increases in transport speeds in a matter of a very few years. There will be new facets to our lives in the period following this war, and one of the most important developments, as far as transportation is concerned, will be the introduction of jet-propelled aircraft.

"Hitherto unheard-of speeds will be common in large jet-propelled transports ten or maybe fifteen years from now, and every capital on the globe will find itself within one day's flying time of every other capital. Jet engines remove the barriers formerly limiting the top speed of aircraft, and we should see aircraft speeds passing through the compressibility range (approximately 725-775 miles per hour at sea level) in a relatively short time.

"The basic problems have been pretty well worked out. Now we are entering a period of development that should be at least as spectacular as the development period of the aircraft in the twenty years after the first world war."

Pilots Entertain

Annual Dinner of G.A.P.A.N. and B.A.L.P.A.

FRIENDLY leg-pulling was, perhaps, the dominant note in the speeches made at the annual dinner of the Guild of Air Pilots and Navigators and the British Air Line Pilots' Association held in London last Thursday. How the two bodies manage, with the help of the Royal Aeronautical Society, to produce such an excellent meal in wartime is something of a mystery, but the "do" was certainly a great success in every way.

In proposing the toast of the pilots' associations, Sir William P. Hildred, Director-General of Civil Aviation, recalled in humorous vein the many things that had happened during the last year: Swinton, Montreal, Chicago, the Council, the White Paper on "the three incomprehensibles," and now "Bobby" Perkins (Flt. Lt. W. R. D. Perkins, M.P., it will be remembered, is Under-Secretary (Designate) of the Ministry of Civil Aviation). Sir William recalled that it was "Bobby" Perkins who agitated and brought about the Cadman Committee. He would not dare to call him "Bobby" much longer, and so did it as often as he could while there was time. A busy time was ahead. There would have to be legislation for the Ministry of Civil Aviation, for the White Paper and for a great many other things.

Air Vice-Marshal D. C. T. Bennett emphasised one good thing the war had done: it had shown the value of co-operation, and we had to take that faith in one another into the peace. The two associations were faced with two points of view: that of the old hands and that of the new members coming in. The latter were the "new boys," but nevertheless they had something to contribute.

Flt. Lt. W. R. D. Perkins, M.P., admitted that he had spent the Sunday reading some of his old speeches, and was rather shaken by some of the things he had said, but he recalled the saying about more joy about one sinner. Nine years ago the B.A.L.P.A. was started "under the counter." It had rows with the Air Ministry and with the G.A.P.A.N., but now, fortunately, the two associations were great friends. He was glad to say the B.A.L.P.A. had always had a very good friend in Sir William Hildred, whom he assured that if he (Mr. Perkins) did become Under-Secretary, they would always get a cheery reception if they came to him.

Lord Londonderry (Master of G.A.P.A.N.), proposed the toast of the guests. He welcomed the appointment of Mr. Perkins. It was well known that it was a good plan to turn a poacher into a gamekeeper!

Fund of Knowledge

Capt. J. W. G. James, chairman of B.A.L.P.A., pointed out that many executives of firms were old pilots. The two associations had a fund of up-to-date knowledge, and he hoped that this would be made full use of by appointing practical pilots to the various committees. If that were not possible, at least members of the two associations should be called in for consultations at conferences.

Major H. R. Kilner, president of the S.B.A.C., said the industry would want all the help it could get from experienced pilots, but he did plead for greater unanimity. It was extremely difficult to get two pilots, let alone more, to agree, and if the constructors *could* get concerted views from pilots it would be a great help.

Air Commodore Vernon S. Brown, Chief Inspector of Accidents, Air Ministry, was one of the delegates to the Chicago Conference. He stressed the great importance of the many technical questions on which agreement had been reached.

THE CHOSEN FEW

OF the 2,200 airports in the U.S. and the 250 military flying fields in the world, only about 10 are big enough to accommodate aircraft of the Super Fortress type, it was stated by Mr. Ayres, of the Pan American Airways, at a meeting of the Society of Automotive Engineers.

SIR RICHARD FAIREY LEAVES B.A.C.

SIR RICHARD FAIREY, who was appointed director-general of the British Air Commission in Washington in 1941, has resigned from this position and will be succeeded, at the end of the present month, by Mr. H. O. R. Hindley, at present director of organisation at the Air Ministry.

Sir Richard has been obliged by the state of his health to ask Sir Stafford Cripps for his release, and in granting his request the Minister of Aircraft Production said that Sir Richard had "performed service of the utmost value to the war effort."

Before founding the Fairey Aviation Co. in 1916, Sir Richard was chief engineer to Short Bros. for three years.

NORWAY'S PLAN

THE Norwegian Air Council has been given authority to run airlines until the Norwegian Parliament can take final decisions concerning the organisation of civil air traffic after the war.

The council will now be in a position to conclude agreements with airlines in other countries and to start air routes immediately the war is over.

It is hoped to restart the air routes as quickly as is practicable, as all military and civil operations during and after the liberation of Norway depend very much on transport and rapid postal communications. All inland air routes are to be co-ordinated from the beginning with the foreign air network, including the British.

A plan for the Norwegian air routes is now being prepared. Norway has a number of civil aircraft already operating and others on order.

WORLD MEETING

THIRTY-SEVEN airlines, from all over the world, including 17 from the U.S., will send representatives to attend the first meeting of the International Air Transport Operators' conference, opening at Havana, Cuba, on April 16th.

MALTA HALT

MALTA will be used as a staging post on the projected civil air service from the United Kingdom to South Africa, it was officially stated in the Malta Council of Government, quoting the Colonial Secretary.

Although calls may eventually be made at Rome, this is not intended as a substitution for Malta.

ENGLISH ELECTRIC POST-WAR

AT a recent Press visit to the Preston works of the English Electric Co., Ltd., where Halifax bombers have been built in large numbers, Sir George Nelson, chairman of the company, made the interesting announcement that English Electric intends to remain in aviation after the war. It may be recollected that during the first world war the firm produced many aircraft, and, with Mr. W. O. Manning as chief designer, built the Ayr flying boat, a machine with very unorthodox features, and the little Wren light aircraft (10 h.p. A.B.C. motor cycle engine), which took part in the light aircraft trials at Lympne. The company thus has had a long association with flying. We are informed that Mr. W. E. W. Petter, late of Westland Aircraft, has joined the English Electric Co. as chief engineer (aircraft), and that he is now getting together a technical staff for the aircraft design office.

"Teddy" Petter is not bound by convention, as witnessed by the Lysander and Whirlwind, and at Preston he may be expected to produce something out of the ordinary. That he has fairly exciting plans for the future we know, and with such powerful backing he should produce some really advanced aircraft. Sir George Nelson is a man of broad vision, and the combination should result in some very interesting developments.

The Miles M.48 and M.6

A Post-war Light Plane for the Not[so-cl]
Private Owner : Stalling Speed 25 [m.p]

The M.48 is[three-f]
A feature is th[excel]
from the fron[seats.]
modation is th[same]
the earlie[Miles]

EARLY in 1943 (in our February 4th issue to be exact) we described the Miles M.28 monoplane, which had been designed and built to fulfil two functions: as an intermediate trainer and as a communications aircraft. Production of the M.28 will continue after the war, when the type will be known as the Miles Mercury, but a slower and cheaper version intended for club use and for the inexperienced private owner.

The Miles "Everyman's Plane," as it might be called, is the type M.48. It is based upon the M.28, and, in fact, has the same fuselage and a similar 3-4-seater cabin arrangement, with a remarkable view from the two front seats.

Features introduced in the M.48 as compared with the M.28 for the benefit of the rougher type of handling which the machine might be expected to receive in the hands of club members and not-very-skilled private owners, are a larger wing area (to reduce wing loading and landing speed), a long-travel fixed undercarriage of wide track, and three rudders instead of two. This latter feature has been necessitated by the extremely low stalling speed resulting from the low wing loading.

The M.28 had a wing area of 160 sq. ft. That of the M.48 is 191 sq. ft. Miles retractable auxiliary aerofoil flaps give the wing a very high maximum lift coefficient, and as the wing loading is but 12.5 lb./sq. ft., the stalling speed reaches the amazingly low value of 25 m.p.h. It is scarcely surprising that three rudders have become necessary to ensure full control at stalling speed.

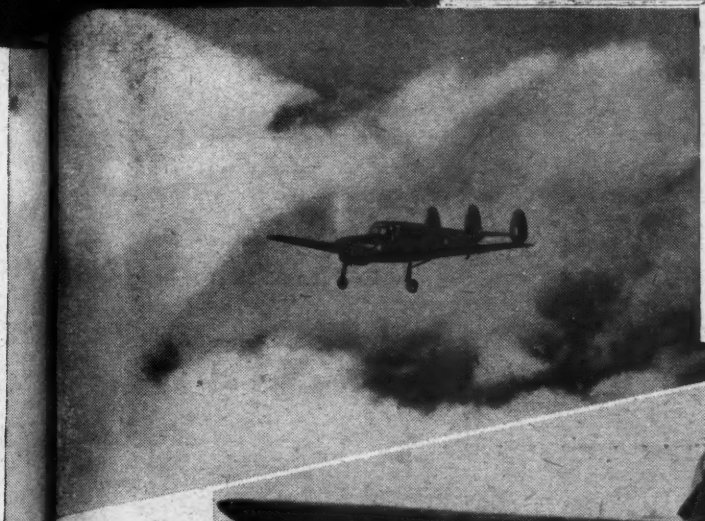
Three rudders are somewhat unusual on a single-engined machine. They are made necessary by the very low stalling speed.

In this view of the M.48 prototype the undercarriage legs are unfaired. The production machines will have "stockings."

M.61

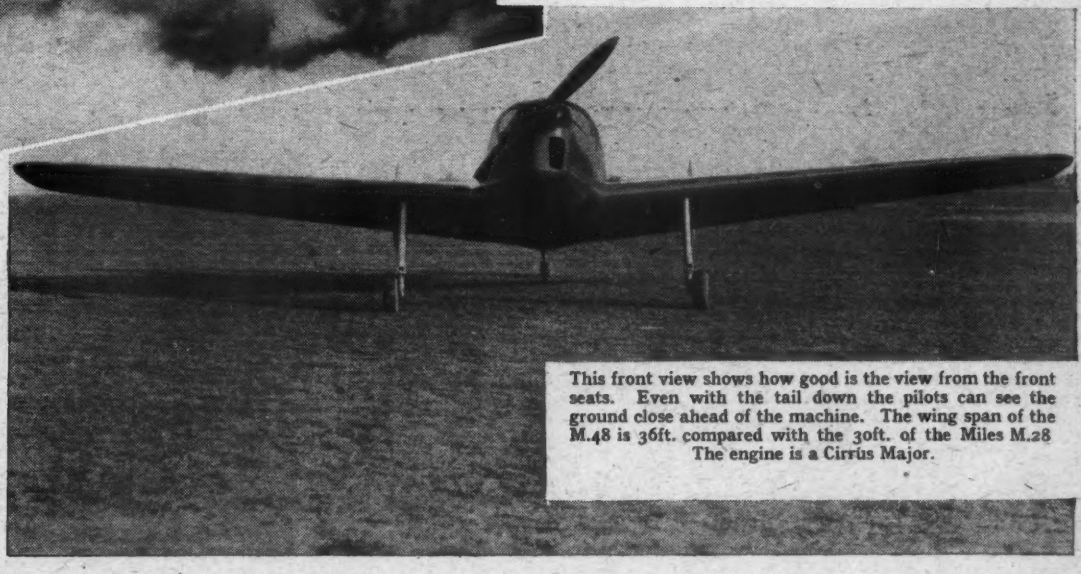
Not so-clever d 25 m.p.h.

three-four seater. excellent view seats. Accom- same as that of Miles M.28



By way of demonstrating the take-off and landing capabilities of the M.48 Mr. George Miles, its designer, has a trick of operating it from among the rows of cars parked on a corner of the airfield in front of the works at Reading. We do not deny that he chooses a patch where he can get a take-off run of about 60-70 yards, but for all that, the demonstration is extremely convincing. Against a light breeze of some 5 m.p.h. the machine is off the ground in 60 yards, and it will clear a 50-ft. obstacle in 150 yards. The landing run is almost nil.

With the powerful controls available, the M.48 is as near being foolproof as no matter, and even if a beginner or inexperienced pilot should make a mistake he is hardly likely to come to very much harm at 25 m.p.h. airspeed. On most days of the year that will mean, when near the



This front view shows how good is the view from the front seats. Even with the tail down the pilots can see the ground close ahead of the machine. The wing span of the M.48 is 36ft. compared with the 30ft. of the Miles M.28 The engine is a Cirrus Major.

THE MILES M.48 AND M.61

ground, a speed over the ground of 15-20 m.p.h., or the speed of a car in a built-up area!

The larger wing area and the fixed undercarriage have brought down the speed somewhat as compared with the M.28 Mercury. Even so, however, a cruising speed of 115 m.p.h. should suffice for most purposes. It is coupled with a duration of five hours, or in other words a still-air range of 575 miles. The short take-off run and good angle of climb should make possible operation from quite small fields, a fact which many prospective private owners will appreciate.

A Useful Series

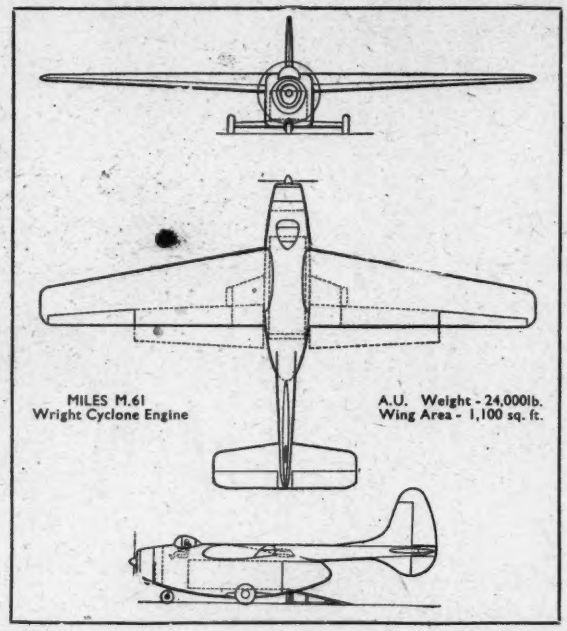
With a Cirrus Major engine the M.48 has a tare weight of 1,500 lb. The disposable load is 900 lb., so that the all-up weight is 2,400 lb. The wing span is 6ft. greater than that of the M.28, viz. 36ft. Miles Aircraft, Ltd., may have other passenger types in mind, but so far a very good beginning may be said to have been made with the Brabazon 5A, the M.28 Mercury, and the M.48. All three types should have a useful application in the post-war markets of the world. It might be mentioned that the photographs which illustrate this article show the prototype, which has been used as a communications aircraft and has therefore been well tested. The undercarriage legs look a bit bare, but the production model will doubtless be provided with becoming "stockings."

That Miles Aircraft, Ltd., appreciate the possible need for military and civil freighter aircraft is shown by the fact that a year or two ago tentative designs were submitted to M.A.P. for two such machines, the M.61 and the M.62. They may remain what they are at present, merely projects, but it is, nevertheless of interest to see how different designers attack the same problem. The M.61, of which we publish the general arrangement drawings, was intended to be built mainly of wood, while the M.62 was to be of all-metal construction.

In a general way the basic design of the two was similar, but the larger machine was designed as a twin-engined type, while the smaller has a single engine. The most characteristic feature is a short nacelle-like fuselage from which springs a single boom carrying the tail.

The M.61 was designed for easy and cheap series-production, and aerodynamic refinement was sacrificed to ease of loading. The engine chosen for the M.61 was the Wright Cyclone G.R.2600 A.5 B. of 1,600 h.p., a number of which was believed to be in storage in this country at the time, due to a change in programme. The Bristol Hercules could, however, be substituted for the Cyclone.

Loading of freight was to be effected through very large hinged doors at the rear end of the nacelle. The freight compartment had a level floor 19ft. long by about 6ft. 6in.



wide. The minimum height was 5ft. 6in. The platform was only 2ft. 6in. from the ground, and a road vehicle would be able to be driven straight in up a short ramp. A fixed tricycle undercarriage was chosen to ensure a level floor.

The provisional design was based on a load factor of 4½ at an all-up weight of 24,000 lb. At that weight a payload of 3.75 tons could be carried with a range of 1,000 miles. Wing span was 94ft. and gross wing area (icluding stub wings) 1,100 sq. ft. The tare weight was estimated at 11,290 lb. Crew and equipment accounted for 1,170 lb. and fuel and oil for another 2,800 lb. This left a cargo weight of 8,740 lb.

At the full gross weight of 24,000 lb. the distance to unstick in still air was calculated to be only 450yd., and to clear a 50-ft. obstacle 680yd. With an initial wing loading of 21.8 lb./sq. ft. and a power loading of 15 lb./h.p., the estimated cruising speed on 50 per cent. of take-off power was 164 m.p.h. at 8,000ft. The absolute still-air range was actually more than 1,000 miles—1,100 miles, in fact.

The M.62 was a twin-engined machine with two Cyclones. It was designed for a gross weight of 45,000 lb. and a payload of 7.6 tons. Its cruising speed was estimated at 170 m.p.h. at 8,000ft.

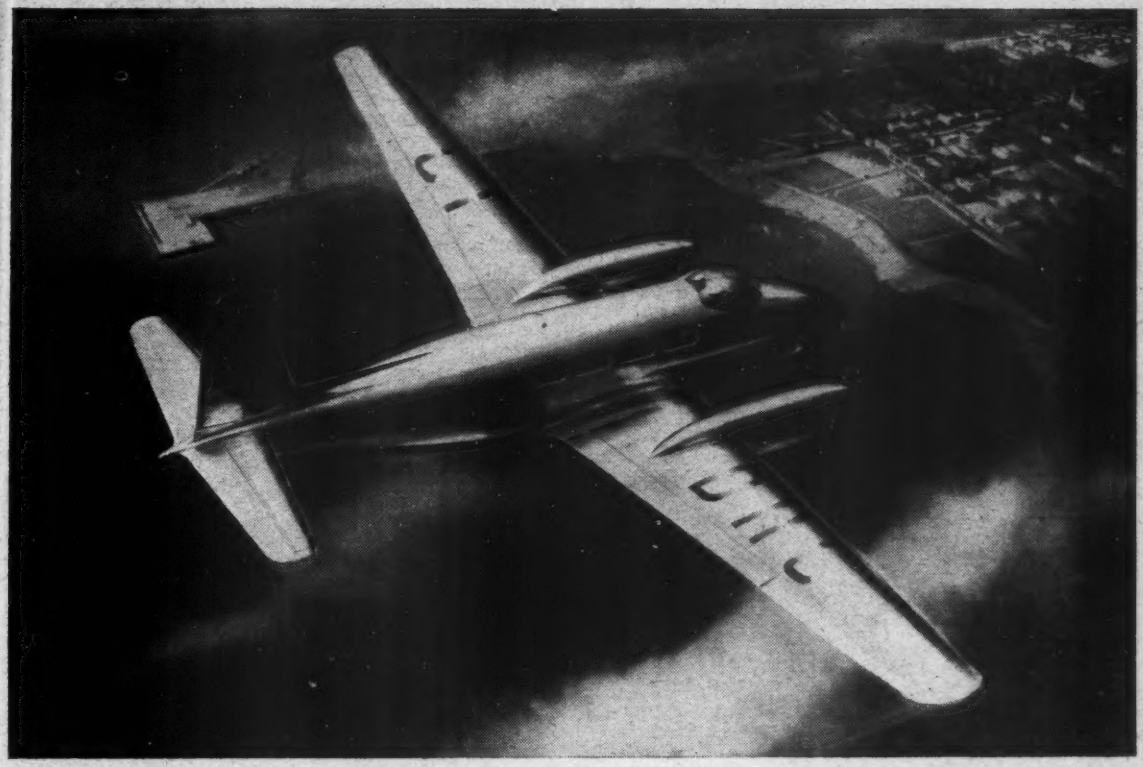
"TO VICTORY WITH THE R.A.F."

DORLAND HALL, Lower Regent Street, has been the scene of a number of exhibitions dealing with various aspects of war activity, and "To Victory with the R.A.F.," which was opened by the Air Minister just before Easter, should be of especial interest now that the fruits of the R.A.F.'s ever-mounting offensive against Germany are being gathered.

This particular building is not, perhaps, ideal for the most effective staging of exhibitions of this kind, but considerable pains have patently been taken to arrange things to best advantage for the visitor and to provide him with a pretty comprehensive survey of the work and achievement of the R.A.F. from the Battle of Britain onwards—all for the modest entrance fee of sixpence which, he will have the satisfaction of knowing, will go to swell the R.A.F. Benevolent Fund.

In addition to the splendid array of official photographs (including stereoscopic views of bomb damage which you may see if you have time and patience to await your turn at one of the machines) there is a wide variety of other exhibits in the form of special equipment. Notable among these latter is a 40 mm. cannon of the kind first announced on the Hurricane IID which did some useful tin-opening among Rommel's tanks in Africa, and a gyroscopic bomb-sight on the gyro-unit of which is the compelling instruction, "DO NOT JAR; HANDLE LIKE EGGS" in red capitals. Londoners will be particularly interested in the large-scale models of V.1, V.2, and our own 22,000 lb. bomb. These are arranged in a row with scale human figures alongside, which gives an excellent idea of their comparative size and, more important still, their relative power. The 22,000-pounder is all warhead! Then there are briefing models of enemy targets, a Leigh light (in operation), and a sort of non-stop showing of combat films taken by Beaufighters on rocket strikes against shipping and other transport. These are seen through a miniature Beaufighter windscreen before which is the control column complete with gun-buttons, which juvenile visitors "operate" with relish.

Elsewhere, an ex-operational officer explains, with the help of a realistic model airfield and a synchrophone, how pilots come in on the beam, while from a gallery one can look down on a large model of a German industrial target on which cunning lighting effects illustrate with considerable realism the progress of a raid on which there is a running commentary. One sees the markers, the glow of fires breaking out in the factories, and the "explosions" of the heavy H.E. as though viewing the raid from one of the participating aircraft.



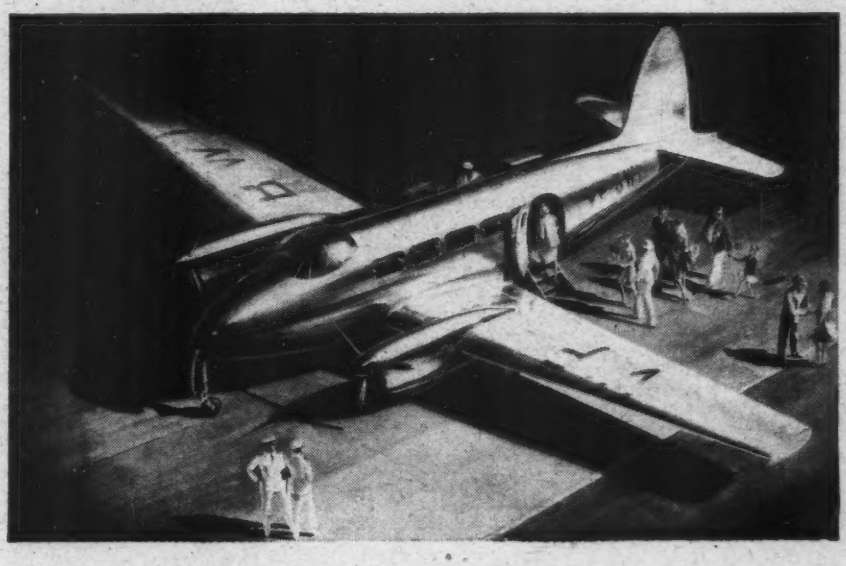
The pictures on this page are an artist's forecast of how the Dove will look. There are traces of the Mosquito in the lines, although the construction is all-metal.

The de Havilland Dove

Modern Successor to the Dragon Rapide : 8 to 11 Passengers : Official Designation D.H.104

FEW aircraft types have had a longer or a more useful life than the de Havilland Dragon Rapide, 89A. First produced in 1934, that machine has been in use in many parts of the world and has proved itself a wonderfully economical type. It is not too much to say that it has made unsubsidised flying possible to the small operator. And it has other honours. For instance, there was a time when the Prince of Wales owned a special Dragon Rapide. Other distinguished owners found it a convenient and reliable machine before the war, and even since the war it has been doing good work as the Dominie.

Its honourable record notwithstanding, the time must come when the D.H.89 must be replaced by something more modern, although for low-density traffic, involving only a few hundred hours' utilisation a year, it is still likely to continue to be the most economical aircraft in its class. Where, however, the utilisation is from about 1,000 hours a year and up-



Modern features of the design include such items as geared and supercharged engines, reversible-pitch airscrews and a tricycle undercarriage.

THE DE HAVILLAND DOVE

wards, the new D.H.104 will show a lower cost per passenger-mile or ton-mile; owing to its greater speed and superior qualities.

In our issue of July 20th, 1944, we published an appeal to readers for suggestions for a name for the 104. At the time we expressed the view that "Dove" would be suitable, and we are glad to see that this is indeed the name which it has been decided to give the type.

The general appearance of the Dove is forecast in the two drawings of the machine published on p. 399. The artist has shown us a graceful low-wing monoplane of high aspect ratio. The low setting of the wing may, perhaps, be regretted by some of the passengers, whose view it will obstruct, but the alternative was a high wing, which would have brought the Gipsy Queen engines level with the pilot, and would thus have obstructed his view. This would have been a more serious objection. The rear wheels of the tricycle undercarriage would also have had to be longer and heavier, with greater complications in arranging retraction.

Various cabin accommodations are, of course, possible. A minimum of eight passengers is coupled with toilet accommodation, luggage and freight compartments fore and aft, and a crew of two, with dual control and a convenient radio layout. If the toilet is omitted the cabin will seat 10 passengers, and if the aft luggage compartment is eliminated there is room for an extra passenger. Obviously, the Dove will be suitable for feeder-line work on fairly short stages, for charter traffic, for the transport of firms' executives, and for the well-to-do private owner if any be found to survive after the war.

Power for the Dove will be provided by two of the latest supercharged Gipsy Queens. They will drive new de Havilland three-bladed, constant-speed feathering and braking airscrews. In last week's issue we published an article on the advantages of reversible-pitch airscrews, based on the tests and experiments of a Swiss firm, the Escher Wyss Engineering Works, of Zürich. At the time we were not permitted to state that there are de Havilland reversible-pitch airscrews in existence, but we did hint that British manufacturers are not being left behind in this new field of development. It is an amazing sight to see an aircraft so equipped touch down, rev. up its engine, come to a standstill in an incredibly short distance, and then, if the engine is not throttled back at once, begin to move backward slowly! Obviously, for a twin-engined aircraft, it is essential that the reversing mechanism shall be 100 per cent. reliable, otherwise an unfortunate swing is liable to develop at an awkward moment.

Full details of the de Havilland Dove may not be published at the moment, but the prototype is now being built, and the machine has first priority in the company's civil programme.

NATIONALISING

THE Australian Government is preparing to set up a statutory authority to operate airlines. These steps are being taken in conformity with the Government's declared policy to nationalise air transport.

It is predicted that the statutory authority would have a status similar to that of the Australian Broadcasting Commission, and that Qantas Airways would be allowed to operate services to India and later to the U.K.

RECONVERSION COSTS

AMERICAN airline operators had agreed "100 per cent." that it was uneconomical both from the standpoint of manpower and costs to reconvert military aircraft for commercial use.

At a Press conference after the first meeting of a newly formed airline industry advisory committee Mr. Henry P. Nelson, director of the Aircraft Division of the U.S. War Production Board, said that in almost all instances so far it had cost as much to convert a military aircraft for civilian use as the original cost of a machine, and that in some cases it had cost more. Military aircraft, even those originally built for commercial service and taken over by the Army for war uses, required almost complete rebuilding before they could be used for commercial passenger service, and were already obsolete in design. The same skilled man-power could build new aircraft of more modern design with the same effort and time.

RENFREW TRAFFIC

DURING the past five years aircraft operated by Scottish Airways, Ltd., between Renfrew Airport and other points have carried over 50 per cent. of the entire commercial air traffic of the United Kingdom. Since the beginning of the war the company's fleet of aircraft, which at present consists of ten de Havilland Dragon-Rapides, have flown 4,000,000 miles, carried 100,000 passengers and 4,500,000 lb. of mail and freight.

The growth of traffic is indicated by statistics comparing 1935 with 1943. In 1935 Scottish Airways and its predecessor companies flew 188,927 miles, while passenger journeys numbered 6,877 and freight and mail weighed 197,677 lb. Eight years later the air mileage had increased to 735,058, passenger journeys to 22,167 and freight and mail to 1,043,535 lb. Another feature has been the carrying out of 700 air ambulance flights from the Western Isles to Glasgow.

SUPER CLIPPER

A FUTURE successor to the DC-7 is the monster Clipper to be built by Consolidated Vultee for Pan American World Airways. This type, it is claimed, will make possible the Pan American programme of international mass transportation at cheap rates for which the company is now trying to secure the United States Government approval.

The new 160-ton Clipper, equipped with six engines mounted on the rear trailing edge and fitted with pusher-type airscrews, is 182ft. long and has a wing span of 230ft. Its total payload of 50,000 lb. allows for 204 passengers and 15,300 lb. of express and mail to be carried 4,200 miles. Cruising speed of 310 to 342 m.p.h. will enable a non-stop New York to London flight to be made under a little more than nine hours.

The structure of the Clipper is double-decked with nine state rooms; two lounges and rest rooms will also be provided, and cabins will be conditioned for operation at 30,000ft.

Although 90 per cent. of the initial designing is reported to be finished, production will begin only with the removal of war restrictions.

WORLD'S LARGEST: A model of the 204-passenger Consolidated Super-Clipper.

Blackburn Project

Flying Boat of More than 300,000lb. Gross Weight : Six Engines, and Pressure Cabin for Operation at 15,000ft.

MORE than once we have called attention in these pages to the omission from Government pronouncements of the flying boat class of aircraft. We regard this omission as lamentable because we believe that in the really large sizes this type will be needed. The outlook is grim. At a Press conference held just at the time of the publication of the recent White Paper on Civil Aviation, Lord Knollys, chairman of B.O.A.C., was asked about the corporation's views and plans as regards flying boats. His answer was the somewhat disturbing one that the corporation would naturally watch developments closely, and if the flying boat developed satisfactorily he would consider its employment.

It is fairly obvious that unless B.O.A.C., or its co-monopoly company which is to operate the South American routes, places orders for flying boats, there will be no flying boat development. No private concern can afford to undertake such development work as a "private venture." Most of the best aircraft types in the R.A.F. have been developed as private ventures, but with commercial types it is a different matter. In America there is already under way an enlarged version of the Mars, and Great Britain will be running a very serious risk if she neglects the development of the flying boat.

The very large landplanes contemplated must of necessity introduce many untried features. The concentrated undercarriage loads and the almost fantastic runway lengths required are among the more obvious. It is no exaggeration to say that flying boats of comparable or even greater weight could be designed and built with the assurance that untried or experimental features would be but a small fraction of those of a corresponding landplane.

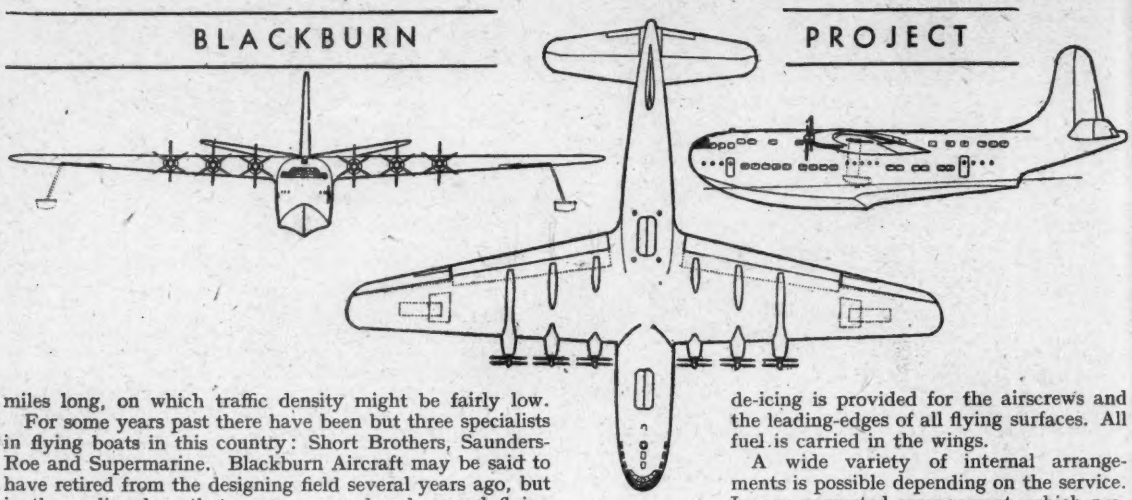
As enthusiastic flying-boat supporters we have discussed the pros and cons with a great many people, and the only serious objection to the flying boat which has been brought up in argument against the class is its inability to operate when the sea freezes over. Last winter, for example, flying boats were icebound both on this and the other side of the Atlantic for some weeks, while landplanes continued to operate. We do not argue that flying boats should be used on routes on which the sea freezes over during six months of the year. But we do maintain that there are very many routes in the world on which ice does not form a serious hindrance for more than a few weeks. Others are entirely free from this particular trouble.

The Ice Problem

In shipping we do not abandon harbours which have a freeze-over for some weeks or months of the winter. We use icebreakers to clear lanes for the shipping and thus extend the usefulness of the harbours. There should not be any insuperable difficulty in extending this operation, for the benefit of flying boats, to sweeping the lanes for loose ice floes which might be a danger to flying boats. That would be a great deal cheaper than the establishment and maintenance of airports having runways two or three

Most unusual feature of the Blackburn 138-ton flying-boat project is the use of six engines, of unspecified type, driving contra-rotating airscrews. The photograph on the right is of a scale model.

BLACKBURN PROJECT



miles long, on which traffic density might be fairly low.

For some years past there have been but three specialists in flying boats in this country: Short Brothers, Saunders-Roe and Supermarine. Blackburn Aircraft may be said to have retired from the designing field several years ago, but in the earlier days that company produced several flying boats, notably the Iris "family." Even in present times the firm has built Short Sunderlands on a large scale, so that obviously both design staff and workers are accustomed to this class of aircraft. We are very glad that Major R. D. Rennie has not altogether given up hope. He has been Blackburn's chief seaplane designer for many years, and although little official encouragement has been given and but few draughtsmen can be spared from urgent war work, Blackburns have found it possible to get out a project for a six-engined transport flying boat. So far it remains merely a project, but at least it serves to focus attention on this class of aircraft.

The aircraft is of orthodox general arrangement, but its great size will at once attract attention. A six-engined, high-wing monoplane with single fin and rudder, it has a gross weight of 310,000 lb. (138 tons) (compare this with the 22 tons of the Sunderland boat), and its wing span is 202ft., or nearly twice that of a four-engined bomber of to-day. It has an overall length of 148ft., and is designed for a top speed at sea level of 307 m.p.h., and for an average cruising speed at 15,000ft. of 269 m.p.h. Its range will naturally vary with the number of passengers carried, and a number of alternatives have been worked out. With a range of 2,500 miles the Blackburn boat would carry 160 passengers and 30,400 lb. of freight and mail, or 85 passengers and 57,700 lb. of freight and mail, both figures being based on daytime seating accommodation. Equivalent figures for a range of 4,375 miles are 72 passengers and 2,980 lb. freight allowing for sleeper accommodation, or 85 passengers and 3,450 lb. freight, allowing for daytime seating.

Pressure Cabin

In view of the operational altitude of 15,000ft., all crew, passenger and freight spaces are pressurised to give atmospheric conditions equivalent to an altitude of 8,000ft. only. To achieve this, the hull is built in the form of a body of approximately circular cross-section extending the full length, and the planing surfaces are built on to this body. The main body is pressurised from the bow to aft of the galley, which is to the rear of the passenger or freight compartments. The space between the main body and the planing bottom is at atmospheric pressure. This space is watertight and is subdivided into compartments of such size that in the event of damage the flooding of any two adjacent compartments would not sink the aircraft.

The tailplane is given considerable dihedral, which increases the clearance from the water thrown up during take-off. Wing-tip floats are fitted and these may be either fixed or retractable. The aircraft is of all-metal construction. Aluminium alloy is used in the main for framing and skin plating, and steel for highly stressed parts. Thermal de-icing is provided for the airscrews and the leading-edges of all flying surfaces. All fuel is carried in the wings.

A wide variety of internal arrangements is possible depending on the service. In one suggested arrangement, which provides for 85 passengers, two decks are provided. On the upper deck, forward, is located the operational cabin, providing for pilot, co-pilot, navigator, radio operator and engineer. To the rear of the operational cabin is the crew's rest room. Apart from the galley at the rear, the remainder of the upper deck is given over to freight space.

General Particulars

Maximum gross weight	310,000 lb.
Overall length	148 ft.
Overall span	202 ft.
Wing area	5,000 sq. ft.

Performance (Based on Gross Weight)

Top speed at sea level	307 m.p.h.
Absolute ceiling	20,000 ft.
Initial rate of climb	940 ft./minute.
Cruising altitude	15,000 ft.

Cruising Performance

(1) Still air range	2,500 miles.
Mean cruising speed	269 m.p.h.

Payload

85 passengers + 57,710 lb. freight and mail (based on daytime seating accommodation).
120 passengers + 44,960 lb. freight and mail.
160 passengers + 30,460 lb. freight and mail.
All freight 90,960 lb.

Cruising Performance

(2) Still air range	4,375 miles.
Mean cruising speed	280 m.p.h.

Payload

85 passengers (day seating) + 3,450 lb. freight.
45 passengers (sleeper) + 15,125 lb. freight.
72 passengers (sleeper) + 2,980 lb. freight.

*The above payloads are based on a passenger weight of 180 lb. plus 55 lb. baggage per passenger.

On the lower deck the forward compartment houses the winches and other marine equipment, and the auxiliary electric generating plant, etc. The forward passenger saloon comes next and is divided in two by a screen bulkhead. The forward portion has seating for 29 passengers and the after portion seating for 24 passengers. A central passage flanked by toilet and dressing rooms joins the forward and aft passenger saloons. The latter has seating for 32 passengers, and to the rear of this compartment is the entrance hall, and aft of this a compartment for passengers' baggage.

One aspect which is often lost sight of is that the development of a large flying boat will probably cost less than that of a corresponding landplane. The wings are the same for both. The hull can be a scaled-up version of smaller, well-tried hulls and thus should not introduce any experimental features. The undercarriage for a large landplane, on the other hand, presents problems which cannot be said to have yet been solved.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

JET PROPULSION

What Happens to the Thrust ?

I HAVE read with interest the recent articles on jet propulsion, but there are three points arising which are not quite clear. First, if the propulsive force of the aircraft is due to the reaction of discharging hot gases into the atmosphere, which part of the structure is stressed to take the thrust? On an aircraft moved by a propeller (to use the Service term), the thrust is transmitted via the thrust bearing to the engine mounting. On the jet propelled aircraft it might seem to be distributed over the whole surface area.

Secondly, where does the thrust line lie? If, as suggested above, it acts all over the aircraft, it will coincide with the drag line. It seems more probable, however, that the thrust will act through the turbine and compressor.

Lastly, if the fuel consumption is given in pounds/h.p. hour and the power is measured in pounds thrust (as in Air Comdre. Banks's paper), what is the conversion formula to use?

Perhaps some of your readers could clear these problems up by the adroit use of a couple of masses and three or four velocities. As for the last one, it defeats my supercharged, power-operated, electro-hydraulic slide rule.

P. A. HEARNE.

THE SLIGHTED SERVICE

Gratitude for Services Rendered ?

FOR its traditional modesty and for its unpretentious ways, the Royal Navy has earned for itself the title Silent Service. One is tempted to bestow upon those of a less traditionally endowed but no less unassuming body, the title, Slighted Service.

I refer to the Royal Observer Corps and, in particular, to the voluntary, part-time, post observers.

There has been of late such a spate of criticism, *ad nauseam*, levelled at our much-maligned and long-suffering government that it is with reluctance that I would add yet more to the din, but my criticism is, I trust, justified and, I am convinced, fair.

It was announced recently that gratuities would be awarded to certain of the civilian services in recognition of their various contributions, amongst which was listed the R.O.C. I wonder, however, apart from those in contact with the Corps, how widely the facts of the gesture were appreciated ?

Unless I am misinformed (and I do not believe this to be the case) it is an apparent fact that only those members of the Corps classified "A"—that is the whole-time members—will qualify for these gratuities, which though not considerable represent quite a fair sum when considered for the full period of the war years. The "B" members, however, fail to qualify.

Let us ponder awhile.

The full-time man, as is implied, does nothing else (as regarded at least by Official Eyes) but man his post, for which he is paid, if not handsomely, a sum each week which is in excess of that collected by the bemused "B" member. He does not deviate from his normal pursuits nor does he suffer unduly from the consequences of a disorganised day. On the other hand the unfortunate part-time man may have to arrange his work to fit in as a subsidiary item to what was once no more than a hobby, and sink the ensuing inconveniences in his enthusiasm, lacking which there would appear to be little or no prospects for it.

It must be very apparent that, without wishing to minimise the work of the "A" men, the greater contribution is made by these part-time people, who, however, fail to qualify for the gratuity.

Why has this most unjust decision been made ?

The question of gratuities was bound to be unsatisfactory, and one is forced to the conclusion that they would be better far to have been given to the three fighting Services only, rather than ladle out these inconsistent sums in such a haphazard and indifferent manner.

The Official Eye is a cold and frigid one, and is accepted as such, but of late there have been distinct and too frequent signs of myopic trouble accompanied by periods of forgetfulness, the effects of which have both hurt and discouraged those who have suffered.

I am not a "B" member of the R.O.C. so my grievance is a purely impersonal one, but this stupidity is being felt by the voluntary men who have devoted so much time and energy to their work. It is not the loss of the gratuity that they resent but the shabby and indifferent way their services are acknowledged.

SENTEK.

THE CURTISS ASCENDER

And Other Experimental Fighters

IN your article on the Curtiss Ascender which appears in *Flight*, April 5th, the author rather labours the point that it was thus named because it could climb fast. Actually, the origin of the name is more subtle than that. The principal characteristic of this aircraft is that it flies back-end first—in other words, it is a backender. Substitute a more Rabelaisian word for back, and you have the answer !

Regarding other aircraft mentioned in the article, there is little mystery about any of them. The MacDonnel XP-67 is an experimental twin tractor monoplane with a skate-shaped plan-form. It has already been illustrated in many publications both here and in the United States. [See *Flight* of Feb. 22nd, 1944.—ED.]

The RP-64 is really the rather ancient North American NA.50 single-seat fighter, six of which were ordered by Siam in 1940 When the United States entered the war these aircraft were impounded and incorporated into the U.S. Army as advanced combat trainers under the designation RP-64. The prefix R (Restricted) signifies that they are not considered fit for combat use.

The XP-37, XP-42 and XP-46 were all experimental Curtiss fighters. The XP-37 and XP-42 were both converted P-36's, the former fitted with one of the earliest Allison V-1710 engines and a turbo supercharger, and the latter with a special Pratt and Whitney engine with extended airscrew shaft for enclosed cowling experiments. The former dates from 1937 and the latter 1940-41. The XP-46, which also dates from 1940-41. was an attempt to improve on the original P-40 both in performance and armament, the latter being interesting in featuring a combination of the then U.S. and British standard fighter armament—two 50-cal. fuselage guns and eight 30-cal. wing guns. It never proceeded beyond the experimental stage.

LEONARD BRIDGMAN.

SELLING AIR SAFETY

Importance of Cheap Fares

YOUR correspondent "Realist" (*Flight*, March 20th), at first reading, appears to hit the nail on the head in suggesting that a publicity campaign will be necessary to "sell" the public the true facts of safety in air travel. Second thoughts, however, may alter this opinion. Publicity campaigns are expensive. The end of the war, with the return to civilian life of thousands who have flown safely many thousands of miles, and the continued actual existence of cheap, I repeat cheap, air travel will in quite a short time overcome timidity in progressive people. The non-progressives will never be convinced anyway. Were they in the birthdays of railways or motor cars? No. But as soon as such travel became cheap things went all one way; witness the popularity of motoring, despite a deplorable death rate due to car accidents.

Unfortunate emphasis has recently been laid on air accidents involving "very important personages," on the crashes of friendly aircraft involving civilian casualties on the ground, damage to property, etc. Such "news" as portrayed by the daily Press is out of proportion by reason of security silence being maintained about the number of air-miles flown in total by the Services. I suggest that when it is possible to show by figures that the number of "accidents" compared with air-miles flown are infinitesimal, the public view of air travel will change, and if, in addition, air-travel can be proved to be reasonably cheap compared with other forms of transport, always bearing in mind that we have to pay for speed, then it will, almost automatically, become popular.

This in spite of spontaneous and ignorant statements made by B.B.C. broadcasters, as mentioned by "Realist."

I would rather see "publicity campaign" money used to cheapen fares so that the day may quickly come when the public will step into an aircraft with the same assurance as they did into a railway carriage before the war.

"NAPPER."

PERPETUAL MOTION : B for Baker leaves to bomb Berlin for the 30th consecutive night on which the Mosquitoes of Bomber Command attacked the capital.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Awards

Bar to Distinguished Service Order

Act. Wing Cdr. A. D. J. LOVELL, D.S.O., D.F.C., R.A.F.O.—Since the award of the Distinguished Service Order this officer has taken part in many more operational sorties and has destroyed at least a further three enemy aircraft, bringing his total victories to 19 enemy aircraft destroyed. He has led his wing on many low level attacks against road targets in the face of intense enemy fire His enthusiasm and fine leadership have been reflected in the successes achieved by the wing since April, 1944, which has destroyed 30 enemy aircraft and over 1,000 enemy vehicles, besides damaging 50 enemy locomotives. Both in the air and on the ground, Wing Cdr. Lovell has set an inspiring example of courage, skill and devotion to duty.

Distinguished Service Order

Act. Wing Cdr. C. L. W. STEWART, A.F.C., R.A.F.O., No. 255 Sqn.—Wing Cdr. Stewart has taken part in a large number of operational sorties. He is an outstanding commanding officer who, by his enthusiasm, energy and fine leadership, has materially contributed to the excellent operational record attained by the squadron. During the period of his command the squadron has destroyed 21 enemy aircraft and destroyed or damaged 100,000 tons of shipping on the Danube. Throughout, this officer has displayed a high degree of courage and determination, and has never let either adverse weather or enemy opposition deter him from completing his missions.

Lt. Col. R. A. BLACKWELL, D.F.C., S.A.A.F., No. 24 (S.A.A.F.) Sqn.—This officer has completed three tours of operational duty. Since the award of the Distinguished Flying Cross he has participated in many more operational sorties, and has led his squadron with distinction and courage. In July, 1944, he led the squadron on an attack against a railway tunnel north-west of Florence, which necessitated flying over 50 miles of extremely heavily defended territory. In the face of intense fire from the enemy's defences, which damaged all the aircraft, Col. Blackwell led his squadron to the target and obtained hits on the tunnel mouth, rail cars and tracks. All the aircraft returned safely to base. Throughout three years of operational activity this officer has displayed outstanding leadership, ability and devotion to duty.

Act. Wing Cdr. A. H. C. ROBERTS, D.F.C., R.A.F.O., No. 7 Sqn.—In December, 1944, Wing Cdr. Roberts captained an aircraft in an attack on the airfield at Mulheim. Intense and accurate anti-aircraft fire was encountered over the target and the aircraft was badly damaged. One member of the crew was seriously wounded. Nevertheless this officer pressed home a successful attack. Before leaving the target area the aircraft was again hit by shrapnel. Displaying outstanding airmanship, Wing Cdr. Roberts flew his severely damaged bomber to an airfield where he executed a masterly landing. This officer, who has completed a large number of sorties, has invariably displayed the highest standard of skill, courage and resolution.

Act. Wing Cdr. L. M. WHETHAM, D.F.C., A.F.C., R.A.F.O., No. 35 Sqn.—One night in November, 1944, Wing Cdr. Whetham piloted an aircraft in an attack on Dusseldorf. Almost immediately after taking off the port outer engine failed. Despite the loss of engine power this officer continued to the target. When approaching the Ruhr defences extremely accurate anti-aircraft fire was encountered. The aircraft was hit. Considerable structural damage was sustained and a large amount of oxygen was lost. Nevertheless, Wing Cdr. Whetham executed an excellent bombing run and afterwards flew the aircraft safely to base. This officer has completed a large number of sorties against strongly defended targets. He has displayed high qualities of skill and leadership, and throughout his devotion to duty has been unfailing.

Bar to Distinguished Flying Cross

Flt. Lt. W. S. GAUNT, D.F.C., R.A.F.V.R., No. 627 Sqn.—This officer was the observer in one of a formation of aircraft detailed to attack an enemy target. Whilst over the target considerable anti-aircraft fire was encountered. Flt. Lt. Gaunt's aircraft sustained severe damage. He himself was struck in the leg by a large piece of shrapnel. Although in great pain, this resolute observer refrained from informing his pilot, and continued to give him every assistance during the bombing run. After leaving the target area, Flt. Lt. Gaunt himself applied a dressing and a tourniquet to his wound. Displaying exceptional resolution, he insisted on fulfilling his duties until the aircraft was within a few miles of base. This officer set a fine example of courage and devotion to duty.

Flt. Lt. N. RUSSELL, D.F.C., R.A.F.V.R., No. 235 Sqn.—Since being awarded the Distinguished Flying Cross this officer has participated in numerous sorties, and has displayed a high degree of skill and gallantry throughout. In January, 1945, Flt. Lt. Russell took part in an engagement against a large force of enemy aircraft, four of which were shot down, two of them by Flt. Lt. Russell himself. This officer has displayed the greatest keenness for operations, and has set a splendid example to all.

F/O. D. G. TONGUE, D.F.C., R.A.F.V.R., No. 410 (R.C.A.F.) Sqn.—As observer, this officer continues to display a very high standard of skill and devotion to duty. One night in November, 1944, he flew with great distinction on a sortie during which he assisted in the destruction of three enemy aircraft. Throughout, he displayed exceptional coolness and resolution, setting a splendid example.

Distinguished Flying Cross

Group Capt. D. W. F. BONHAM-CARTER, R.A.F.
Act. Wing Cdr. L. S. M. BAILEY, A.F.C., R.A.F., No. 35 Sqn.
Act. Wing. Cdr. J. H. GLOUGH, R.A.F., No. 582 Sqn. (Lt., The West Yorkshire Regiment, The Prince of Wales Own).
Act. Wing Cdr. G. B. READ, R.A.F.V.R., No. 158 Sqn.
Act. Sqn. Ldr. G. E. ABECASSIS, R.A.F.V.R., No. 161 Sqn.
Act. Sqn. Ldr. A. T. BUCKLAND, R.A.F.V.R., No. 109 Sqn.
Act. Sqn. Ldr. J. J. BRAY, R.A.F., No. 214 Sqn.
Act. Sqn. Ldr. W. G. FOXALL, R.A.F.V.R., No. 109 Sqn.
Act. Sqn. Ldr. W. G. K. GORRIE, R.A.F.V.R., No. 115 Sqn.
Act. Sqn. Ldr. P. W. G. LESTER, R.A.F., No. 582 Sqn.
Act. Sqn. Ldr. F. E. LORD, R.A.F.V.R., No. 77 Sqn.
Act. Sqn. Ldr. D. J. MASTERS, R.A.F.V.R., No. 576 Sqn.
Act. Sqn. Ldr. G. E. MITCHELL, R.A.F.V.R., No. 622 Sqn.
Act. Sqn. Ldr. G. W. A. PARKER, R.A.F.V.R., No. 105 Sqn.
Act. Sqn. Ldr. T. RIMMER, R.A.F.V.R., No. 109 Sqn.
Act. Sqn. Ldr. J. SPEDDING, R.A.F.V.R., No. 109 Sqn.
Act. Sqn. Ldr. J. A. WILSON, R.A.F.V.R., No. 156 Sqn.
Flt. Lt. R. G. ALLEN, R.A.F.V.R., No. 149 Sqn.
Flt. Lt. B. ARDEN, R.A.F.V.R., No. 50 Sqn.
Flt. Lt. C. G. BELLHOUSE, R.A.F.V.R., No. 76 Sqn.
Flt. Lt. J. H. BENISON, R.A.F.V.R., No. 10 Sqn.
Flt. Lt. J. L. BILLINGTON, R.A.F.V.R., No. 97 Sqn.
Flt. Lt. P. J. BRYANT, R.A.F.V.R., No. 35 Sqn.
Flt. Lt. B. M. BUSH, R.A.F.V.R., No. 128 Sqn.
Flt. Lt. J. J. CANNING, R.A.F.V.R., No. 7 Sqn.
Flt. Lt. A. A. CASTLE, R.A.F.V.R., No. 101 Sqn.
Flt. Lt. W. H. COKE-KERR, R.A.F.V.R., No. 139 Sqn.
Flt. Lt. R. J. L. CRABB, R.A.F.V.R., No. 12 Sqn.
Flt. Lt. C. B. CRAFER, R.A.F.V.R., No. 10 Sqn.
Flt. Lt. D. CURZON, R.A.F.V.R., No. 7 Sqn.
Flt. Lt. J. E. DANN, R.A.F.V.R., No. 192 Sqn.
Flt. Lt. W. B. ELLIS, R.A.F.V.R., No. 7 Sqn.
Flt. Lt. P. ENDERBY, R.A.F.V.R., No. 105 Sqn.
Flt. Lt. J. A. FAWDON, R.A.F.V.R., No. 10 Sqn.
Flt. Lt. M. B. FRENCH, R.A.F.V.R., No. 153 Sqn.
Flt. Lt. T. K. GRAVES, R.A.F.V.R., No. 169 Sqn.
Flt. Lt. M. C. C. HAYCRAFT, R.A.F.V.R., No. 101 Sqn.
Flt. Lt. A. C. HEAFY, R.A.F.V.R., No. 635 Sqn.

SERVICE AVIATION

Flt. Lt. F. HILL, R.A.F.V.R., No. 692 Sqn.
Flt. Lt. M. W KITSON, R.A.F.V.R., No. 156 Sqn.
Flt. Lt. J. A. MAHOOD, R.A.F.V.R., No. 109 Sqn.
Flt. Lt. T. J. MCARTHUR, R.A.F.V.R., No. 460 (R.A.A.F.) Sqn.
Act. Flt. Lt. N. L. HILL, R.A.F.V.R., No. 214 Sqn.
Act. Flt. Lt. W. E. B. MASON, R.C.A.F., No. 156 Sqn.
Act. Flt. Lt. F. G. MOOTE, R.C.A.F., No. 7 Sqn.
Act. Flt. Lt. J. D. MORISON, R.C.A.F., No. 77 Sqn.
Act. Flt. Lt. H. NELSON, R.C.A.F., No. 10 Sqn.
Act. Flt. Lt. D. R. PAMPLIN, R.C.A.F., No. 103 Sqn.
Act. Flt. Lt. W. R. PARKS, R.C.A.F., No. 10 Sqn.
Act. Flt. Lt. C. S. RAILTON, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
Act. Flt. Lt. D. ROBERTSON, R.C.A.F., No. 576 Sqn.
Act. Flt. Lt. R. G. ROSS, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Act. Flt. Lt. D. G. STEWART, R.C.A.F., No. 10 Sqn.
Act. Flt. Lt. J. W. TIMS, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
F/O. D. W. BABB, R.C.A.F., No. 426 (R.C.A.F.) Sqn.
F/O. J. R. P. BEAUDET, R.C.A.F., No. 23 Sqn.
F/O. C. W. BRYSON, R.C.A.F., No. 576 Sqn.
F/O. J. BURCH, R.C.A.F., No. 433 (R.C.A.F.) Sqn.
F/O. L. BUTT, R.C.A.F., No. 10 Sqn.
F/O. D. G. CHANCE, R.C.A.F., No. 424 (R.C.A.F.) Sqn.
F/O. N. J. COLES, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
F/O. J. E. COLEY, R.C.A.F., No. 10 Sqn.
F/O. R. S. CUMMINGS, R.C.A.F., No. 431 (R.C.A.F.) Sqn.
F/O. J. L. J. FONTAINE, R.C.A.F., No. 35 Sqn.
F/O. T. H. FORD, R.C.A.F., No. 626 Sqn.
F/O. D. P. FROST, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
F/O. J. A. GAULT, R.C.A.F., No. 432 (R.C.A.F.) Sqn.
F/O A. H. GRANDA, R.C.A.F., No. 102 Sqn.
F/O. G. A. HALL, R.C.A.F., No. 7 Sqn.
F/O. D. E. HARRIS, R.C.A.F., No. 434 (R.C.A.F.) Sqn.
Flt. Lt. I. H. HANLON, R.N.Z.A.F., No. 627 Sqn.
Act. Flt. Lt. W. R. BIRDLING, R.N.Z.A.F., No. 83 Sqn.
Act. Flt. Lt. L. B. BRIGGS, R.N.Z.A.F., No. 83 Sqn.
Act. Flt. Lt. M. L. HORE, R.N.Z.A.F., No. 149 Sqn.
Act. Flt. Lt. I. G. RICHARDS, R.N.Z.A.F., No. 622 Sqn.
Act. Flt. Lt. N. V. SPANHAKE, R.N.Z.A.F., No. 90 Sqn.
F/O. D. COOK, R.N.Z.A.F., No. 218 Sqn.
F/O. A. L. DICKISON, R.N.Z.A.F., No. 149 Sqn.
F/O. J. S. HARRIS, R.N.Z.A.F., No. 149 Sqn.
Capt. L. C. KLINCK, S.A.A.F., No. 571 Sqn

Conspicuous Gallantry Medal (Flying)

Sgt. D. J. ALLEN, R.A.F.V.R., No. 467 (R.A.A.F.) Sqn.—This airman was the mid-upper gunner in an aircraft detailed to attack Dusseldorf one night in November, 1944. During the operation the aircraft was attacked by a fighter. Sgt. Allen opened fire, but the enemy aircraft closed in and the bomber was struck by a burst of machine gun fire which caused much damage. A second attack followed and again the aircraft was hit. The port outer engine caught fire. All efforts to extinguish the flames were unavailing. Later, the aircraft lost height and then dived out of control. The position became hopeless and the captain ordered his crew to abandon aircraft. The rear gunner was unable to open his turret doors and was trapped. With complete disregard for his own safety, Sgt. Allen promptly went to the assistance of his comrade. The aircraft was now on fire and falling rapidly. Nevertheless, this gallant airman hacked away at the turret doors with an axe and finally succeeded in freeing his comrade. Just as Sgt. Allen got ready to jump, the aircraft broke in two. He fell clear, however, pulled the rip cord of his parachute and descended safely. In the face of extreme danger this airman displayed conduct in keeping with the best traditions of the Royal Air Force.

Distinguished Flying Medal

Flt. Sgt. J. AFFLECK, R.A.F.V.R., No. 76 Sqn.
Flt. Sgt. G. W. ALLEN, R.A.F.V.R., No. 12 Sqn.
Flt. Sgt. A. G. C. ANSON, R.A.F.V.R., No. 90 Sqn.
Flt. Sgt. (now P/O.) B. J. F. HAYES, R.A.A.F., No. 83 Sqn.
Flt. Sgt. J. G. WATSON, R.A.A.F., 582 Sqn.
Flt. Sgt. B. LEACH, R.A.F.V.R., 582 Sqn.
Sgt. J. A. A. SKERRITT, R.A.F.V.R., 40 Sqn.
Flt. Sgt. G. E. NEWTON, R.A.F.V.R., No. 140 Sqn.
Sgt. G. ELSTON, R.A.F.V.R., No. 69 Sqn.
Sgt. F. O. NICHOL, R.A.F.V.R., No. 69 Sqn.
Flt. Sgt. J. M. CARROLL, R.A.A.F., No. 582 Sqn.
Sgt. T. MYATT, R.A.F.V.R., No. 582 Sqn.
Sgt. M. A. C. BROWN, R.A.F.V.R., No. 683 Sqn
Sgt. W. T. STOKES, R.A.F.V.R., No. 467 (R.A.A.F.) Sqn.
Sgt. J. FRANKLAND, R.A.F.V.R., No. 195 Sqn.
Sgt. F. C. WILLIAMS, R.A.F.V.R., No. 195 Sqn.
Flt. Sgt. R. GARDNER, R.A.F.V.R., No. 10 Sqn.

Roll of Honour

Casualty Communiqué No. 486.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of these 149 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—P/O. K. R. Armstrong; Flt. Lt. G. H. Ash, D.F.C.; Sgt. R. E. Atkinson; Sgt. J. Bidwell; Sgt. E. G. Blake; W/O. J. W. Bruce; F/O. W. H. Bush; Flt. Lt. F. J. J. Champion; P/O. J. H. Chester; Sgt. J. C. Cordery; F/O. P. J. Dawson; Sgt. G. Duff; F/O. T. I. M. Evans; Sgt. I. F. Forrest; Sgt. J. A. Hayes; Sgt. P. D. Hockley; Sgt. J. S. Jones; Sgt. N. I. Langley; Sgt. D. G. Murphy; Flt. Sgt. G. Older; Flt. Sgt. P. W. Rattray; Flt. Lt. J. A. Reid; Sgt. M. Rowntree; Flt. Sgt. C. Savery; Sgt. D. Smedley; Sgt. J. C. W. Smith; Flt. Sgt. J. D. Suffolk; Sgt. T. L. Sumner; Sgt. W. G. Tarrant; F/O. J. Weddell; Sqn. Ldr. R. E. Wilkinson, D.F.C.

Air Marshal Sir John Slessor, K.C.B., D.S.O., M.C. (right), with Lt. Gen. Ira C. Eaker, leaving after a farewell parade on the occasion of his relinquishing the appointment of Dep. Air C.-in-C. M.A.A.F., to become Air Member for Personnel.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. A. K. Cowie; Sgt. D. G. Cutler; F/O. R. N. Foster; F/O. D. A. L. Hall; F/O. H. R. Horley; Sqn. Ldr. P. W. Lefevre, D.F.C.; Sgt. J. Lowery; F/O. D. W. Major; P/O F. W. Shuttle.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. E. J. Argent; F/O. D. N. Armitage; F/O. K. L. Atkins; Flt. Sgt. W. Baines; Sgt. F. W. Barrie; Flt. Lt. K. H. Berry, D.F.M.; Sgt. J. Biggs; Sgt. J. L. Blackwood; Flt. Sgt. H. Blewett; Flt. Sgt. H. S. Brown; P/O. J. D. S. Cable; Sgt. S. Cameron; Sgt. A. W. Canty; P/O. C. J. B. Cogdell; Sgt. C. Craigie; Wing Cdr. J. F. Dilworth; Sgt. W. B. Dixon; Sgt. A. W. Dowsett, D.F.M.; F/O. D. P. Doyle; Flt. Sgt. F. Edwards; F/O. F. E. Forshew; Sgt. G. Fradley; Sgt. M. Gallagher; Sgt. J. Garbutt; Sqn. Ldr. J. M. Garlick, D.F.C.; Sgt. E. W. Gray; Sgt. J. Greenwall; Flt. Sgt. H. J. C. Gwyn; F/O. C. N. Hale; Sgt. W. R. Hales; P/O. R. Halperin; Flt. Sgt. N. L. Holder; Flt. Lt. S. W. Holmes; W/O. N. J. Holmwood; Sgt. W. Hope; Flt. Sgt. A. H. Jefferies; Sgt. C. E. Jones; F/O. G. D. Kewley; Flt. Sgt. J. R. King-Meggat; F/O. P. Kinsella; P/O. V. A. R. Langford; Sgt. R. Ledsham; Sgt. W. E. Lloyd; Flt. Sgt. H. M. Lynes; Flt. Lt. D. G. McAlpine; Sgt. D. W. Marshall; Sgt. M. A. Martin; Flt. Sgt. C. B. Mills; F/O. J. Moffatt; Sgt. E. C. Nott; F/O. C. W. Nunn; Sgt. W. O'Malley; Sgt. L. E. Parker; Sgt. R. H. Paxton; Flt. Sgt. J. J. Peacock; F/O. R. P. D. Perkins; Flt. Lt. B. O. Petrides; Sgt. L. R. Price; Sgt. A. E. Reeve; Flt. Sgt. B. S. Reynolds; Sgt. G. P. Roche; Sgt. W. J. Sander; Sgt. C. Saunders; Sgt. H. Simpson; Flt. Sgt. J. Slack; F/O. J. C. Southey; W/O. K. McL. Smith; Flt. Sgt. A. A. Stanbridge; Sgt. C. S. Stockwell; Flt. Sgt. G. M. Storey; Sgt. G. A. Sullivan; Sgt. C. Talby; Sgt. B. Thorpe; Flt. Lt. W. Thomas, D.F.C.; Sgt. C. B. Todd; Flt. Sgt. G. Vandervyver; Sgt. W. Walch; Sgt. A. E. Watkins; Sgt. J. W. Whitley; F/O. K. Wilcock; Sgt. J. Wood.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. G. H. Kemp.

WOUNDED OR INJURED IN ACTION.—Sgt. T. Price.

MISSING.—A/C.1 T. Adams; A/C.1 A. S. Alderson; Flt. Sgt. R. Alderson; Sgt. C. Allen; F/O. J. H. Asplin; Sgt. J. Astley; Sgt. J. C. D. Bartlett; Sgt. J. Bassett; F/O. J. R. Bell; P/O. A. W. Bishop; Sgt. D. Bolton; Sgt. D. N. Bommel; P/O. F. E. G. Brown; Sgt. P. Bryant; Cpl. T. W. Carson; Cpl. R. B. Cathcart; Flt. Sgt. G. H. Cockburn; P/O. J. F. Cooke; Sgt. J. Cowie; Sgt. H. H. Day; Sgt. J. F. Dines; Flt. Sgt. S. Dixon; Sgt. R. Eke; Sgt. J. L. Forrester; Sgt. C. R. Freeman; F/O. R. Gordon; A/C.1 D. E. Griffiths; Sgt. F. D. Halford; F/O. H. L. Hallam; F/O. H. W. Hayward; Sgt. S. Helper; Sgt. G. Hodgkinson; Sgt. S. G. Hone; Flt. Sgt. W. J. Hudson; A/C.1 E. V. Irons; F/O. T. C. James; Sgt. G. I. Jones; Sqn. Ldr. P. Kelly, D.F.C.; A/C.1 R. J. Kerr; F/O. J. V. Kingdon; Sgt. F. H. Lacey; L.A/C. K. S. Latham; L.A/C. J. Y. Laurie; A/C.2 J. Leech, F/O. R. Limbert, D.F.C.; Flt. Sgt. B. E. Longhurst; F/O. A. R. L. Lundie; A/C.2 E. Lyth; F/O. O. J. McAlinden; Sgt. T. Macdonald; Flt. Sgt. N. S. McNeilly; Flt. Sgt. G. Marchant; Sgt. R. May; Sgt. G. C. Mays; Sgt. J. Mooney; F/O. M. Morgenstein; Flt. Sgt. E. Morris; Sgt. J. E. Mulhall; Flt. Lt. W. F. M. Naismith; P/O. D. McL. Nimmo; Sgt. D. H. O'Neill; Flt. Sgt. A. Palmer; Sgt. I. Parry; Flt. Lt. W. G. Payne; Sgt. A. I. Prescott; F/O. R. C. Preston; Sgt. J. Provan; Sgt. V. R. Read; F/O. H. Rees; Flt. Sgt. R. T. Rogers; P/O. L. D. Sampson; W/O. R. A. Scott; Sgt. R. Scott; Sgt. M. Sedgwick; Sgt. N. G. Simpson; Sgt. R. J. Sims; Flt. Lt. P. G. Sinclair; Flt. Sgt. J. K. Smith; Flt. Sgt. K. J. Spackman; Sgt. C. Stepney; Flt. Sgt. J. Stewart; Sgt. L. R. O. Taylor; Flt. Sgt. P. Telford; Sgt. A. A. Thistlethwaite; P/O. W. J. Turner; F/O. A. R. Verrier, D.F.C.; Group Capt. C. T. Weir; Flt. Sgt. A. J. Weston; Sgt. D. P. Westwater; F/O. R. Williams; Flt. Sgt. L. A. Windress; Sgt. W. V. Woodall; F/O. F. A. Wooding.

KILLED ON ACTIVE SERVICE.—Sgt. A. J. Brown; Flt. Sgt. G. Brunt; Sgt. J. E. Cotton; F/O. L. W. H. Craig; Sgt. C. V. Garside; Flt. Sgt. M. W. Hanley; Flt. Lt. D. Ibbotson, D.F.C.; Sgt. M. T. Jones; F/O. J. McHardy; F/O. D. G. Mackenzie; Sgt. D. G. Newland; P/O. F. H. Ruffle, D.F.C.; Sgt. A. J. Wallace.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. D. Austin; Sgt. E. A. Cairns; Flt. Sgt. R. P. Crawford; Sgt. A. W. Fletcher; F/O. A. D. H. Gray; F/O. K. R. Guiton; Sgt. J. H. Jaeger; F/O. E. N. McLeod-Nibbs; Flt. Sgt. J. L. Mallon.

WOUNDED OR INJURED ON ACTIVE SERVICE.—A/C.2 W. G. Buist; L.A/C. W. J. Nelson.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—A/C.1 A. Greenwood; L.A/C. R. G. Merridale; Sgt. E. T. H. Williams.

DIED ON ACTIVE SERVICE.—P/O. A. Bremner; W/O. W. B. James, D.F.M.; A/C.2 J. L. Pearson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. R. Clark; Flt. Sgt. A. P. Cochrane; Sgt. H. Eckford; Flt. Sgt. A. F. Hamilton; Flt. Sgt. F. R. Rowe; Flt. Lt. F. G. Shaw; Flt. Sgt. P. A. Tannen; Flt. Sgt. T. J. Taylor; P/O. W. H. Taylor; P/O. J. S. Woodward; Sgt. B. H. Wright.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. E. Gee.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. C. Collas.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. M. M. Corcoran; W/O. J. B. Horgan.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. R. J. Ayers; Flt. Sgt. J. M. Booth; Flt. Sgt. R. E. Bromley; Flt. Sgt. C. W. M. Corkill; Flt. Sgt. D. N. Dawson; P/O. E. O. Deveson; Flt. Sgt. D. F. Fulford; Flt. Sgt. J. G. L. Glazebrook; Flt. Sgt. L. W. L. Godfrey; P/O. G. P. Godwin, D.F.C.; Flt Sgt. C. H. Henn; P/O. S. J. Ireland; Flt.

SERVICE AVIATION

Sgt. M. N. Jennings; Flt. Sgt. M. W. Jones; Flt. Sgt. D. Menere; P/O. D. F. Moore; Flt. Sgt. J. R. Moulsdale; Flt. Sgt. W. S. Sinclair; Flt. Sgt. M. H Squires; Flt. Sgt. A. K. Trevena; Sgt. R. S. Trigwell; Flt. Sgt. A. St. C. Turner.

MISSING.—Flt. Sgt. R. S. Chandler; P/O. J. Dickie; Flt. Sgt. W. Herbertson; Flt. Sgt. M. A. Jones; P/O. R. F. McMaster; P/O. F. J. Pettiford; F/O. K. R. Stewart.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. F. Porter; Flt. Sgt. J. W. White.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—P/O. A. J. Wilcox.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Flt. Lt. J. N. B. Garden.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Sgt. J. Ansell; W/O. H. J. Long

Royal Canadian Air Force

KILLED IN ACTION.—Flt. Sgt. D. C. Beattie; Flt. Sgt. F. W. G. Cosgrave; Flt. Lt. J. T. Hardy; Sgt. M. L. Hill; Flt. Lt. W. D. Irwin; Flt. Lt. J. A. Johnson; F/O. C. M. Kendall; W/O. C. Kinton; W/O. J. McCallum; Sgt. J. W. L. Patterson; W/O. F. J. Peters; F/O. J. H. Shand; Flt. Sgt. J. Warburton; Flt. Sgt. D. G. White; F/O. F. Yarush.

WOUNDED OR INJURED IN ACTION.—Sgt. G. C. Porter; Flt. Lt. J. S. Sefton.

MISSING, BELIEVED KILLED IN ACTION.—P/O. J. J. S. Yanota.

MISSING.—W/O. J. G. Chamberlin; F/O. J. G. Fraser; F/O. H. A. Jeffreys; F/O. J. C. McIver; W/O. H. A. Stephen.

KILLED ON ACTIVE SERVICE.—Flt. Lt. W. J. Allison; Sgt. J. P. E. Burke; Flt. Sgt. W. J. Dickie; Sgt. J. L. U. G. Dusablon; Sgt. J. A. E. Groulx; Flt. Sgt. D. A. Gunn; P/O. C. Hamel; F/O. A. C. Hirst; F/O. R. M. Jones; F/O. R. Mansfield; Flt. Sgt. J. J. Murphy; F/O. C. J. Preece; Flt. Sgt. L. W. Toth; Sgt. J. R. R. Villeneuve; P/O. G. H. Warren-Darley.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. J. H. McDonough.

Royal New Zealand Air Force

KILLED IN ACTION.—Flt. Sgt. A. H. Fairmaid.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. R. L. Baker; F/O. R. A. Nimmo.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. J. A. Nicholson.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Lt. C. S. Emeny.

MISSING.—F/O. D. C. Westwood.

South African Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Capt. H. J. Buch.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Lt. G. T. Bold; Capt. H. S. Brown; Lt. A. H Gilludeau; Lt. R. E. Laing; Flt. Sgt. D. J. J. Smith.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Capt. J. W. Ross.

MISSING.—2nd Lt. A. C. W. Oddie; Lt. W. G. A. Pitt; W/O. P. W. Van Blerk.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Air Mech. De Van Zyl.

DIED ON ACTIVE SERVICE.—Lt. P. M. C. Israel.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Lt. R. F Hurndall.

Casualty Communique No. 487

Of these 151 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. D. A. Bayliss; F/O. T. M. Cipriani; Flt. Sgt. W. J. McClune; F/O. J. N. Rowbotham.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. R. W. Airey; F/O. R. Barr; Sgt. E. Birch; Sgt. F. C. Butler; W/O. R. Lidgate; Flt. Sgt. T. J. Lightfoot; F/O. J. K. Morrison; Flt. Sgt. P. G. F. Redstone; Sqn. Ldr. G. B. Warnes, D.S.O., D.F.C.; F/O. D. R. Wimlett.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. G. E. Adams; Sgt. A. G. Allwright; F/O. R. L. Archer; Sgt. G. W. Arlett; P/O. D. Baker; Sgt. A. Barclay; P/O. G. W. F. Batchelor; Sgt. A. W. Bell; F/O. A. W. Blakeman, D.F.C.; Sgt. W. F. D. Bolt; Flt. Lt. T. Burger; Sgt. K. Butler; F/O. L. F. Brewer; Flt. Sgt. A. Bryce; Sgt. B. E. Clarke; F/O. F. E. Claydon; P/O. E. P. Cliburn; P/O. W. H. Craig; P/O. S. Daggett; Sgt. J. H. J. Darvall; F/O. J. W. F. Deane; F/O. P. J. De Charmoy; Sgt. J. McC. Dunlop; Sgt. M. Ellick; Flt. Sgt. R. Ellwood; Sgt. T. J. Evans; Flt. Lt. G. A. J. Frazer-Hollins, D.F.C.; Flt. Sgt. D. W. Froggatt; F/O. A. E. W. Gardner; Sgt. L. H. Green; Flt. Sgt. A. Hamilton; Flt. Lt. R. E. Handley, D.F.M.; F/O. G. H. R. F. Harris; Sgt. J. F. Harris; Sgt. H. S. Harrison; Sgt. E. Heap, D.F.M.; Sgt. G. T. J. Heath; Sgt J. Hendry; Sgt. J. Heron; Flt. Sgt. F. W. Hickman; Sgt. L. V. Houlton; F/O. J. Howe; Sgt. E. Hubbert; Sgt. T. J. Jackson; Sgt. T. R. Jackson; Sgt. J. Jamieson; Sgt. J. C. Landon; Sgt. G. Leggett; Flt. Sgt. J. C. Lochhead; P/O. D. W. McConnell; Sgt. A. D. MacGillivray; Sgt. P. J. MacInnes; Sgt. D. McKechnie; F/O. A. P. MacLeod; Sgt. P. Mallon; Flt. Lt. H. J. Miller; Sgt. K. Molyneux; F/O. F. W. Newson; Sgt. P. R. Oxley; Sgt. O. Roberts; Sgt. C. Robinson; P/O. G. H. Spanton; Sgt. H. A. Spencer; Flt. Sgt. R. W. Sutton; Sgt. D. A. Taylor; Sgt. W. A. Taylor; Flt. Sgt. J. A. Thomas; Sgt. C. C. Vicary; P/O. C. H. Waight; Sgt. G. W. Walker; Sgt. A. K. Ward; P/O. R. P. Watts; Sgt. W. E. Whitmarsh; Flt. Lt. F. S. Whittlestone, D.F.C.; Sgt. A. Wiles; P/O. T. B. Wilkin; Sgt. R. C. Wilson; Sgt H. W. Witham; Flt. Sgt. J. B. Wood.

WOUNDED OR INJURED IN ACTION.—Sgt. I. S. Fender; Flt. Sgt. D. S. Presland.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Sgt. A. C. Probert.

MISSING.—Sgt. J. H. M. Adam; Sgt. D. G. Bayliss; Flt. Sgt. A. H. Bedgood; Sgt. R. H. Berrett; Sgt. M. Blenkinsop; P/O. G. Booth; Sgt. G. H. J. Briggs; Flt. Lt. J. H. Burrough; Sgt. L. T. Carter; F/O. M. G. R. Chippendale; Flt. Lt. D. C. Colebrook; Sgt. W. G. Colgrave; Sgt. O. A. M. Cook; Wing Cdr. K. B. Corbould; P/O. W. D. Crebbin; Sgt. J. Crompton; Flt. Sgt. J. M. Cruikshank; A/C.1 W. G. Duff; P/O. C. Elleman; Sgt. D. J. Gissane; Flt. Sgt. W. H. Green; Sgt. G. A. Hanks; Flt. Sgt. R. Hogben; Cpl. V. K. Hughes; Sgt. D. J. Hutchinson; F/O. E. Ingham; Sqn. Ldr. E. J. Irish; P/O. D. V. James; F/O. J. D. Jones; Sgt. T. Leveritt; Sgt. G. A. Levings; F/O. L. E. Light; Flt. Sgt. D. McCann; L.A/C. A. F. MacDonald; A/C.1 A. MacLaren; A/C.1 C. E. McGonagle; L.A/C. J. A. McGow; L.A/C. A. J. MacGregor; Sgt. H. McPake; L.A/C. P. Marshall; Flt. Sgt. K. Martin; Flt. Sgt. A. Matthison; Sgt. H. S. Metcalfe; Sgt. M. H. Moss; Cpl. J. T. Mudd; Flt. Sgt. K. Naylor; Flt. Sgt. V. E. Norman; Sgt. E. V. Norris; Sgt. J. E. Parkin; Sgt. T. I. Powis; Sgt. E. T. Prior; Sgt. H. Sapsed; Sgt. K. Sawkins; P/O. G. Simpson; Flt. Sgt. E. J. Sinfield; Sgt. F. S. R. Smith; Flt. Sgt. E. Spotswood; P/O A. J. M. Starr; Flt. Sgt. J. M. Taylor; A/C.1 F. W. S. Thompson; Flt. Sgt. F. Thompson; Flt. Sgt. J. Thomson; F/O. J. H. Thorne; Flt. Sgt. C. R. Tibbo; A/C.1 D. W. Tickle; F/O. E. A. Tregheim; Flt. Sgt. W. Turnbull; Flt. Lt. H. V. A. Vinnell; L.A/C. W. H. Walker; L.A/C. P. Wardrobe; L.A/C. A. Weinberg; A/C.2 W. A. Wilcox; L.A/C. G. Witheyman; F/O. R. J. A. Woods; P/O. J. A. Wynn; Sgt. E. W. J. Young.

The badge of No. 460 R.A.A.F. Squadron. "Strike and Return."

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Flt. Lt. G. G. Gates; Flt. Sgt. B. T. McCabe.

KILLED ON ACTIVE SERVICE.—A/C.2 G. Battye; Sgt. R. E. H. Bushell; Sgt. S. W. B. Cannell; Sgt. D. A. Dilley; Cpl. J. H. Dunster; Sgt. H. S. Emery; P/O. E. H. Francis; P/O. J. A. Humphreys; Cpl. J. Kane; P/O. P. F. O'Hanlon; Cpl. M. Philliben; F/O. D. J. Povey; Sgt. N. R. Rusher; A/C.1 E. L. Stansfield; Sgt. K. Stodden; Cpl. J. Sweeney; L.A/C. A. W. Tams; L.A/C. E. J. Tate; L.A/C. L. N. Thompson; Sgt. R. Thompson; L.A/C. A. Thorburn; Sgt. H. L. Tizard; L.A/C. E. Vardey; L.A/C. J. C. Vivian; L.A/C. E. Waller; L.A/C. P. Wallworth; L.A/C. F. Ward; L.A/C. W. E. Wheeler; A/C.1 A. Whittaker; L.A/C. S. Whittle.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—W/O. G. Marsh; Sgt. A. Upton.

WOUNDED OR INJURED ON ACTIVE SERVICE.—A. Blanchard; Sqn. Ldr. H. Blatherwick; L.A/C. D. Ellis; L.A/C. W. J. Kesy.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—L.A/C. A. O'H. Flaherty; Sgt. C. L. Hill.

DIED ON ACTIVE SERVICE.—L.A/C. A. Brown; L.A/C. H. F. Cross; L.A/C. W. Deuchars; L.A/C. H. G. Dew; Cpl. J. Dickson; Cpl. A. S. Durose; Cpl. W. G. Harris; A/C.1 H. Hawkins; L.A/C. L. Irving; Sgt. J. E. Milnes; L.A/C. W. Ratcliffe; A/C.1 D. J. Snowden.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Flt. Lt. F. B. Clark; Flt. Sgt. E. Finlay; P/O. G. G. Houston; Flt. Sgt. C. W. Jackson; Flt. Sgt. K. L. G. Le-Heup; Flt. Sgt. W. D. Low; Flt. Sgt. W. H. Lynch; Flt. Sgt. W. G. Walker; Sgt. E. Wilkinson.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. S. C. Grugeon; W/O. C. S. Luke; Flt. Sgt. R. B. McIlroy; P/O. M. McMahon; Flt. Sgt. O. E. Trebilcock.

MISSING.—Flt. Sgt. W. F. Bull; Flt. Sgt. L. W. Flohm; W/O. J. L. Mulhall; F/O. W. G. Ottaway; P/O. G. Purvis; F/O G. H. B. Slinn; F/O. E. W. M. Trigwell; F/O. G. W. Tuck; P/O. G. V. Williams; Flt. Lt. R. R. Witham.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—W/O. G. F. Hough; W/O. J. P. Mellon; W/O. I. R. S. Noble; W/O. R. J. Peck; P/O. H. Pordage.

KILLED ON ACTIVE SERVICE.—P/O. S. D. Easterbrook.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. P. J. R. Steele; F/O. N. O. Thomas.

Royal Canadian Air Force

KILLED IN ACTION.—Flt. Sgt. O. E. Venning.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. J. G. Broadfoot; Flt. Lt. S. R. W. Laine; P/O. R. A. McKay.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. F. C. Allcroft, D.F.C.; F/O. A. A. Ayres; F/O. R. E. Baht;

AFTER THE SHOW: Pilots of an R.A.F. fighter squadron in their mess tent on a forward airstrip in Burma.

F/O. H. F. Beale; F/O. C. S. Brest; F/O. A. Brown; Flt. Sgt. K. H. Buck; P/O. N. E. Carter; P/O. G. Currie; F/O. J. M. David; P/O. S. A. Driscoll; Flt. Sgt. J. H. Evans; W/O. W. J. K. Fletcher; P/O. B. N. Forster; F/O. A. F. Hague; Sgt. R. D. Livingstone; F/O. D. R. C. McDonald; Sgt. A. W. McGrath; P/O. L. C. Main; W/O. P. J. Martin; F/O. O. K. Nelson; F/O. H. D. Paddison; F/O. A. W. Porter; Sgt. J. M. Preston; Flt. Sgt. C. E. Schamehorn; Flt. Sgt. K. E. Schiedel; Flt. Lt. D. D. Shuttleworth, D.F.C.; Sgt. S. J. Swain; F/O. C. Travers.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—F/O. W. H. Egan.

MISSING.—F/O. T. R. Bailey, D.F.C.; W/O. J. F. Emery; F/O. R. W. Evans; P/O. J. G. M. Fisher; Sgt. C. N. Flette; Sgt. R. S. Gray; F/O. E. A. Hine; Flt. Sgt. H. D. Hooper; F/O. G. E. Langille; P/O. F. S. Leech; F/O. T. P. McHale; Flt. Sgt. I. McKinnon; F/O. J. N. O'Donnell; P/O. J. E. Osborn; F/O. H. M. Pope; F/O. L. G. D. Pow.

KILLED ON ACTIVE SERVICE.—Sgt. W. R. Courage; F/O. C. Currie; F/O. J. D. A. East; F/O. M. A. Gleason; F/O. L. E. Pike; Sgt. N. H. Stubbs.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. G. L. Brehaut.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. F. J. S. Guppy.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. C. White.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—W/O. W. L. Bourdat; P/O. D. W. L. Brown; P/O. J. E. L. Davidson; F/O. J. Y. Desrosiers; W/O. A. J. Leach; P/O. D. R. McBurney.

Royal New Zealand Air Force

MISSING.—F/O. J. R. Copland; F/O. H. M. Sheed; F/O. J. H. Sutcliffe.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—F/O. J. W. Norrie.

South African Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Lt. C. A. E. Chadwick; 2nd Lt. J. W. Forrest; Lt. C. G. Heher; 2nd Lt. L. D. Murray.

KILLED ON ACTIVE SERVICE.—Sgt. H. E. Bowman; Lt. J. R. Kriel; Lt. D. H. Sparge; Sgt. R. R. Wilson.

Casualty Communiqué No. 488

Of the names in this list, 148 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. A. L. Barnard; Sgt. R. J. Barron; W/O. D. M. Bell; Flt. Sgt. C. A. Betts; Sgt. H. C. Bowler; Sgt. C. F. Branson; Flt. Sgt. J. N. Croker; Sgt. C. W. J. Dover; Flt. Sgt. L. C. Grieb; F/O. C. G. Haddow; Sgt. W. E. Kain; P/O. E. D. Levens; P/O. J. McCannon; Sgt. R. Moyes; F/O. W. T. J. O'Brien; Sgt. T. R. Orwin; Flt. Sgt. J. R. Patterson; W/O. J. McD. Pike; P/O. J. V. Reddington; W/O. L. R. Rhind; P/O. J. H. Rice; Flt. Sgt. W. Scott; W/O. E. C. Thomas; Sgt. J. F. Wallace.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. W. H. Bell; P/O. G. A. Brown; F/O. R. W. W. Coggins; F/O. W. M. Davies; Sgt. J. W. Dunford; P/O. F. W. Janes.

PREVIOUSLY REPORTED MISSING NOW PRESUMED KILLED IN ACTION.—Sgt. J. Adams; Sgt. P. W. Alderton; Sgt. W. Archibald; Flt. Sgt. R. J. Argent; Sgt. T. W. Bailey; Flt. Sgt. R. W. Basey; F/O. R. B. Bestwick; Sgt. A. Blanksby; Flt. Sgt. F. G. D. Bloom; Sgt. B. Bolt; F/O. P. B. Boulter; Sgt. J. Breaker; Flt. Lt. A. R. Burchett; Sgt. A. A. Burgess; Sgt. E. Campbell; P/O. D. R. Carlile; Sgt. P. R. Cattrall; Sgt. W. H. Chambers; Sgt. F. C. Compton; Sgt. W. H. Cooksey; Sgt. W. R. Cox; F/O. P. G. Davies; Sgt. T. R. Dennis; Sgt. M. Duckworth; Sgt. N. W. Durrant; Flt. Sgt. D. Edwards; Flt. Lt. W. English; F/O. J. E. Evans; Flt. Sgt. F. A. Foster; Sgt. H. Fox; P/O. L. V. Fussell; Sgt. J. Galloway; Sgt. E. J. Grist; Flt. Sgt. E. G. Grundy; Flt. Sgt. R. E. Hackett; Flt. Sgt. M. Hartley; Flt. Sgt. C. E. Harvey; Sgt. S. Hennan; Flt. Sgt. R. Holmes; Flt. Sgt. W. U. Humphreys; Flt. Sgt. A. M. Irwin; F/O. T. H. Jackson; Sgt. I. M. Jones; Sgt. C. P. Kelly; F/O. E. L. J. Key; Sgt. F. W. Kite; Flt. Sgt. R. H. Knight; Sgt. J. Landles; P/O. L. G. Lane; Sgt. T. R. Lee; F/O. C. J. Lidbetter; Sgt. G. J. Low; Sgt. G. E. G. Lucas, D.F.M.; Sgt. P. Luscombe-Armstrong; Sgt. H. A. M. Lyons; F/O. R. S. McAra; Sgt. D. L. Mansfield; Sgt. M. J. Martin; Sgt. E. A. Milliner; Sgt. G. D. Milne; P/O. G. S. Milner; Sgt. N. H. Mitchell; Sgt. T. W. Moore; F/O. H. Mordue; P/O. J. Morton; P/O. G. Myles; Flt. Sgt. A. E. Pinks; Sgt. H. Pole; Sgt. R. F. Purkiss; F/O. D. F. Rands; P/O. G. L. Ratcliffe; Sgt. W. T. Rees; Sgt. F. E. Robson; Sgt. A. M. Rogers; Sgt. E. Russom; Flt. Lt. E. F. Sly, D.F.C., A.F.M.; P/O. C. H. Storer; Sgt. R. D. Taylor; Flt. Sgt. F. O. Thomas; P/O. H. F. Tomalin; Flt. Sgt. F. Wadge, D.F.M.; Flt. Sgt. A. Waite; Sgt. J. W. Wasteney; Sgt. E. Weatherley; P/O. A. C. Whyte; Sgt. K. Wightman; Sgt. C. O. Wing; Sgt. T. K. M. Williams; Sgt. W. A. Wood; Sgt. L. W. Wykes; Sgt. J. Yates.

WOUNDED OR INJURED IN ACTION.—Flt. Lt. J. K. Brown; Sgt. J. Carroll; Sgt. K. A. Nicholson; Sgt. W. J. V. Spreadborough.

MISSING, BELIEVED KILLED IN ACTION.—W/O. R. J. Alexander; Flt. Sgt. A. Liudzius; W/O. L. S. Miller.

MISSING.—P/O. J. E. Ablett; Flt. Lt. J. N. P. Arkle; W/O. H. J. Ball; Flt. Sgt. A. P. Bloomfield; W/O. S. Buchanan; Sqn. Ldr. G. Campbell, D.F.C.; Sgt. R. P. Clancy; Sgt. B. Coleman; Sgt. L. P. Coles; Sgt. J. Constant; P/O. A. D. Danson; Flt. Sgt. D. Darbon; Flt. Sgt. J. Dunn; W/O. F. Edgar; F/O. D. G. Farquhar, D.F.C.; Sgt. P. A. Gosnold; P/O. T. A. Green; Sgt. T. Haddow; F/O. T. R. Hain; Sgt. R. B. Hales; F/O. J. L. Halliday; Sgt. R. W. Harding; W/O. B. H. Harrison; P/O. W. Hodson; W/O. R. Jones; F/O. A. E. Kitchen, D.F.C.; Flt Lt. F. T. L'Amie; Sgt. G. E. Leadbetter; Sgt. T. A. S. Lockey; F/O. J. M. Lyons; Sgt. T. D. McGill; Wing Cdr. A. M. Murphy, D.S.O., D.F.C.; Flt Lt. W. R. Pow; Sgt. G. Rebecca; P/O. E. H. Russell; Sgt. J. C. Samuel; Sgt. D. H. Scott; P/O. F. B. Shaw; F/O. P. Slater; F/O. J. W. Smith; Flt. Lt. F. R. Sokell; W/O. J. R. Sutton; Sgt. E. Thomas; P/O. E. F. L. Voce; Sgt. A. R. Whiffin; P/O. G. Williams.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. E. C. Buttle; F/O. G. D. Gamble, D.F.C., B.E.M.; Flt. Lt. F. E. S. Gardner; Flt. Sgt. J. A. Hitchcock; L.A/C. T. D. Laurie; P/O. J. W. T. Scammell; W/O. R. Williams; Flt. Sgt. E. W. Wright.

KILLED ON ACTIVE SERVICE.—F/O. C. A. Allen; L.A/C. A. Barnes; L.A/C. L. Barr; Flt. Lt. D. Barrett-Lennard; F/O. M. W. Bottomley; Sgt. J. C. Carlyle; Cpl. S. J. Clark; Sgt. E. T. Crow; Sgt. J. Heap; Sgt. R. M. High; Sgt. E. F. Isterling; Flt. Sgt. N. G. E. Ladbrook; F/O. K. W. Laughlin; Flt. Lt. A. E. Marshall, D.F.C., D.F.M.; L.A/C. P. F. Mitson; L.A/C. R. V. J. Payne; Sgt. D. H. Pidgeon; Sgt. J. Pringle; Sgt. J. Rew; Sgt. J. R. Robinson; Sgt. B. A. Rosentreter; W/O. R. W. Shallis; P/O. G. Smith; Sgt. A. Sonenthal; Flt. Sgt. A. D. Springett; A/C.2 J. D. Tait; Sgt. K. P. West.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Lt. P. D. Bowen; F/O. F. Woodmansey.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—A/C.1 H. E. Haywood; Flt. Lt. W. O. Helm.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Cpl. G. G. Andrews; L.A/C. R. H. Glover; Cpl. N. Nettleship; L.A/C. J. D. Prout; L.A/C. E. A. Wheeler; L.A/C. G. Woolfenden.

DIED ON ACTIVE SERVICE.—L.A/C. J. D. Appleby; F/O. J. L. D. Barker; L.A/C. P. Bowden; Flt. Lt. J. C. Butterworth; A/C.2 F. R. Cadey; L.A/C. R. S. Ellis; L.A/C. F. J. Foss; Sgt. H. E. F. Grigg; L.A/C. A. J. Hicks; L.A/C. E. C. Johnson; L.A/C. T. D. McCoo; L.A/C. J. C. Nash; A/C.1 J. O'Neill; Flt. Lt. J. F. Overton; L.A/C. R. C. Philpott; L.A/C. L. Richards; L.A/C. G. E. Shelley; L.A/C. F. J. Tucker; Cpl. F. W. Wainwright; L.A/C. W. J. Wooldridge; L.A/C. R. A. Woolfries.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—W/O. D. V. Airey; F/O. A. K. Baker; Flt. Sgt. F. J. Carey; Flt. Sgt. W. J. Christie; F/O. D. E. Coleman; Flt. Sgt. W. S. Comfort; P/O. P. C. Gore; Flt. Sgt. R. L. Griffiths; Flt. Sgt. F. M. Harris; Flt. Lt. E. Holmes; Flt. Sgt. R. F. Kebbell; Flt. Sgt. H. N. Merrion; F/O. E. O'Donoghue; W/O. J. A. Porter; Flt. Sgt. P. L. Rees; Sgt. E. F. Stokes; Flt. Sgt. R. E. Stubbs; Flt. Sgt. L. J. Venus; Sgt. G. Webster; Flt. Sgt. R. J. Woosnam.

POCKET CARRIERS: *Ancylus*, one of the merchant aircraft carriers used while there was a 500-mile air cover gap in mid-Atlantic. The flight deck was only 400ft. long and aircraft were accelerated off and arrested on alighting.

The badge of the now extinct Balloon Command, "Vi et Ictu" (By Strength and Impact).

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.1 J. W. Forder; L.A/CW. K. Shears.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. P. D. Bateman; Flt. Lt. M. S. Buchanan, D.F.C.; Flt. Sgt. G. A. Phillips.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. B. D. Burnell; Flt. Sgt. J. A. L. Carmichael; Flt. Lt. A. K. D. Fell; P/O. K. R. Wood.

MISSING.—P/O. W. E. Osmond.

KILLED ON ACTIVE SERVICE.—F/O. L. G. Hardiman; Flt. Sgt. M. L. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. N. W. Dowie; P/O. A. G. Harris; Flt. Sgt. W. W. Johnston; P/O. S. J. Lucas; P/O. C. P. North; P/O. F. W. Smily.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. C. P. Byrne.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. A. W. Collins; Flt. Lt. W. J. Robertson; P/O. L. A. Welsh.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. M. Batterton; P/O. F. J. D. Brady; Sgt. G. A. Howitson; Sgt. J. B. L. Legault; P/O. C. W. McFarlane; Flt. Sgt. G. F. Parker; Flt. Sgt. I. S. Rothstein; W/O. N. G. Schultz; Sgt. D. Scott; Flt. Sgt. E. R. Skiarchuk; F/O. F. G. Small; P/O. M. Smith; F/O. M. H. Tarrison.

MISSING.—F/O. K. H. Barker; F/O. W. H. L. Bellingham; Flt. Sgt. W. Chornous; W/O. J. A. A. Comeau; F/O. J. M. Cordick; Flt. Sgt. L. G. Davies; Sgt. L. J. Fitzpatrick; F/O. J. W. Johnston; P/O. C. H. Love; Flt. Lt. T. McAleese; F/O. J. G. Martin; Flt. Sgt. A. F. Morrison; Sgt. J. H. M. Murphy; F/O. H. J. S. O'Brien; Flt. Sgt. N. R. Perry; W/O. L. P. Ramey; F/O. R. J. Reilly.

KILLED ON ACTIVE SERVICE.—F/O. H. Connelly; F/O. J. R. Dunne; Flt. Lt. J. Hunt.

DIED ON ACTIVE SERVICE.—Sqn. Ldr. C. N. Tingle.

Royal New Zealand Air Force

KILLED IN ACTION.—F/O. B. A. Bebarfald; P/O. M. J. Yarwood.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. W. L. Harvey, D.F.M.; W/O. B. S. Wipiti, D.F.M.

PREVIOUSLY REPORTED MISSING, NOW PRE-

SERVICE AVIATION

SUMED KILLED ON ACTIVE SERVICE.—P/O. D. S. McGregor.
DIED ON ACTIVE SERVICE.—F/O. F. R. Clarke.

South African Air Force

WOUNDED OR INJURED IN ACTION.—Capt. R. B. McKechnie.
MISSING.—Lt E. A. Vansije; 2/Lt. J. H. Weeber; 2/Lt R. A. Wittenberg.
KILLED ON ACTIVE SERVICE.—Lt. De Smidt.
PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Lt. H. F. Churchill.

Casualty Communiqué No. 489

Of the names in this list, 154 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. F. J. Deem; Flt. Sgt. J. W. Geldert; Sgt. M. Hempseed; Sgt. D. M. Knox; Flt. Lt. G. V. F. Lloyd; F/O. D. M. McLaughlin; Flt. Sgt. P. B. Marshall; F/O. L. T. Morris; Sgt. P. Morris; Sgt. D. W. Nater; F/O. J. C. Richardson; Sgt. M. B. Rosenberger; W/O. E. Slack; Sgt. A. J. Stevenson; Sgt. R. S. Tommis; Flt. Sgt. G. F. Tribble.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. P. C. K. Bennett; Flt. Sgt. J. Knights; F/O. J. R. Laing; Sgt. C. A. Salt; Flt. Sgt. G. E. Scott; Sgt. A. Vickers.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. D. A. Abbott; Sgt. S. Allom; Sgt. C. Atherton; Sgt. J. E. Barrington; F/O. J. E. Beaumont; Sgt. A. R. Bird; P/O. E. J. Blackley; Sgt. W. C. Boot; Flt. Sgt. E. S. Brown; Flt. Sgt. J. F. Brown; Sgt. F. W. Burdett; Sgt. H. Burkitt; Wing Cdr. P. R. Burton-Gyles, D.S.O., D.F.C.; Sgt. J. Calvert; Flt. Sgt. W. G. Chase; Sgt. L. R. Clack; Sgt. R. J. Colley; Flt. Sgt. C. H. W. Cotterell; Sgt. T. S. Daniel; Sgt. J. R. Davison; Sgt. E. W. Dickman; Flt. Lt. A. Dickinson; F/O. J. C. Doherty; Sgt. T. Earle; Flt. Sgt. E. W. Ebsworth; P/O. S. Evans; Flt. Lt. S. Evans; Flt. Sgt. W. Ferris; Flt. Sgt. H. Fewster; F/O. J. W. Flynn; P/O. F. E. Fox; Sgt. P. Gallagher; Sgt. E. Gedge; Flt. Sgt. C. H. Gow; Flt. Sgt. H. Grainger; Sgt. P. J. Greenmon; Flt. Sgt. W. Hardaker; Flt. Sgt. J. C. Harthill; Sgt. D. B. Harvey; P/O. T. H. Hastings; Sgt. R. T. H. Headford; F/O. D. W. Herbert; Flt. Sgt. T. J. Hirst; P/O. J. Hooson; Sgt. C. A. Hughes; P/O D. Jackson; P/O. H. Johnson; Sgt. G. Jones; Sgt. R. V. Jones; Sgt. T. C. Laing; Flt. Sgt. L. E. Lambert; Flt. Lt. J. H. S. Lee; Sgt. A. E. Leggett; F/O. J. V. Leyland; Sgt. E. J. Lock; P/O. R. H. H. Lunniss; Sgt. H. F. McKernin; Sgt. L. R. H. Michell; Sgt. L. Minshull; Sgt. T. Monteith; P/O. C. H. Mortimer; W/O. G. D. Moody; Sgt. W. F. Neill; Sgt. T. L. North; Sgt. J. E. Novell; P/O. T. E. Ord; Sgt. P. R. Pae; Sgt. G. R. Parker; Sgt. R. Parkinson; Flt. Lt. E. R. Pearson; P/O. D. L. Pirie; Sgt. G. A. Porter; F/O. K. W. Rawlins; Sgt. R. C. Rigg; Sgt. E. J. Roberts; P/O. F. R. Rohrer; Sgt. L. G. Rush; Sgt. J. Russell; F/O. J. Scales; Sgt. R. F. Siddall; Sgt. J. Smethurst; F/O. E. J. Stone, D.F.C.; Sgt. F. A. Sugden; Sgt. K. Swinchatt; Sgt. F. R. Taylor; Flt. Sgt. K. V. Terry; Sgt. F. Tessick; P/O. L. Tucker; Sgt. D. W. Walker; Flt. Sgt. S. J. Wareham; P/O. S. Webb; Sgt. G. West; Sgt. D. Wetherell; Sgt. J. R. Williams; Flt. Lt. J. I. Wiseman; W/O. K. F. Wright.

WOUNDED OR INJURED IN ACTION.—Flt. Lt. G. J. Bailey; Sgt. D. G. Melia; Sgt. L. A. Murray; Flt. Sgt. S. Yeardsley.

MISSING, BELIEVED KILLED IN ACTION.—W/O. J. R. Karasek.

MISSING.—Flt. Sgt. G. Bainbridge; Sgt. E. Battye; Flt. Sgt. G. W. Bebbington; Flt. Lt. J. W. Bennett; Flt. Sgt. R. C. Bidwell; Sgt. S. D. Bolton; Flt. Sgt. A. J. Bonner; F/O. W. J. Bourn; Sgt. C. Brewer; F/O. E. I. Britton; Sgt. G. Brogden; Flt. Sgt. T. Brumfitt; Sgt. E. R. Cooper; Sgt. W. Cooper; Flt. Sgt. D. N. Crawford; Flt. Sgt. R. W. Crook; Flt. Sgt. S. Darroch; F/O. R. J. Dunstan; Flt. Sgt. J. A. Etheridge; Flt. Lt. A. B. Gilbert; W/O. R. A. Hawkins; F/O. A. Henshaw; W/O. D. A. S. Hollay; Flt. Lt. F. G. Holloway, D.F.M.; Sgt. J. Houghton; W/O. J. W. Howie; Flt. Sgt. T. Hughes; Flt. Sgt. A. L. Jackson; F/O. E. Jones; Flt. Sgt. R. F. Juffs; Sgt. E. T. J. Keay; P/O. H. L. Knowles; F/O. G. G. O. Lousada; F/O. P. F. McDonald; F/O. D. C. McIntosh; Flt. Lt. D. R. McLeod; P/O. J. G. Marsden; Sgt. J. W. Massey; Sgt. E. W. Matthews; Flt. Sgt. J. G. Milne; P/O. S. Moore; F/O. J. D. Morgan; P/O. R. H. Morris; Flt. Lt. G. W. S. Moseley; F/O. E. C. Maul; P/O. B. Nicholls; P/O. J. L. Nicholson; Flt. Sgt. K. O. G. Nugent; Flt. Lt. K. J. Pamment; Flt. Sgt. F. E. Peet; F/O. J. F. A. Rayns; W/O. E. Standring; Sgt. A. J. Taylor; Sgt. R. T. Taylor; Flt. Sgt. H. R. Thomas; F/O. K. R. Thompson; F/O. E. A. Turner; Sgt. D. W. Underwood; P/O. R. F. Walliker; Sgt. T. M. Ward; Flt. Sgt. H. C. Wiles; Flt. Sgt. E. R. J. Williams; P/O. I. G. Williams; Sgt. B. Wood; W/O. E. Young, D.F.M.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. F. K. Allan; F/O. N. Atkinson; P/O. W. Charters; Sgt. D. Close; Flt. Lt. K. G. Elliott; Sqn. Ldr. R. H. Harper, D.F.C.; Sgt. G. S. Marshall; F/O. C. R. Parsons; Flt. Sgt. R. Peats; W/O. E. A. Walker; Flt. Lt. D. Welply.

Air Marshal Sir Keith Park, the new Allied Air C.-in-C., South-East Asia, arrives at Calcutta. (Left to right) Air Comdre. F. J. Mellersh, commanding Strategic Air Force; Air Marshal Sir Keith Park; Air Marshal W. A. Coryton, commanding R.A.F. Bengal-Burma, and Air Vice-Marshal G. E. Gibbs, S.A.S.O., R.A.F., Bengal-Burma.

KILLED ON ACTIVE SERVICE.—L.A/C. H. G. Brooks; Sgt K. Oddy; Flt. Sgt. R. N. Dauncey; Sgt. S. David; P/O. L. S. Davies; Sgt. K. J. Hatmer; Sgt. H. Holt; W/O. A. E. Laughton; L.A/C. R. M. S. Lomax; F/O. D. G. Menzies; L.A/C. V. W. O'Brien; Flt. Sgt. R. D. Payne; Flt. Sgt. A. G. Reid; A/C.2 J. F. Searles; Sgt. F. A. Smith; F/O. H. Webster; F/O. E. D. Woods.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW REPORTED KILLED ON ACTIVE SERVICE.—A/C.1 S. Taylor.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. S. Booth; Flt. Sgt. J. G. Campbell; Sgt. H. Chalton; Sgt. S. Long; Sgt. I. G. Morgan; Sgt. P. T. Parker.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. G. E. Kennedy; A/C.2 R. A. Smith; A/C.1 C. E. Tye.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—F/O. C. P. Adams; Sgt. J. F. Boon; Sgt. F. M. S. Tonkin.

DIED ON ACTIVE SERVICE.—Sgt. C. F. Castle; A/C.2 C. W. G. Chillingworth; Cpl. H. C. Collier; L.A/C. A. P. Dowling; A/C.2 P. J. Healey; Flt. Sgt. R. J. Hughes; Sgt. H. Moorhouse; L.A/C. P. J. Naylor; L.A/C. P. Pycroft; L.A/C. C. J. Roberts; L.A/C. E. Sugden; Sgt. T. Williams; Cpl. F. G. Woodrow.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. G. H. Dalton; Sgt. J. F. Forrest; F/O. G. H. Godsell; Sgt. R. J. Head; Flt. Sgt. R. Margerison; Flt. Sgt. R. E. Reeves; F/O. G. H. Scott; Flt. Sgt. C. Van de Velde; Sgt. J. Welsh.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/C.W.1 A. D. Wilson

Royal Australian Air Force

KILLED IN ACTION.—Flt. Lt. K. D. Clarson; P/O. W. J. Sharp.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—F/O. B. W. Foskett.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. L. H. Christmass; Flt. Lt. N. P. Cooper; Flt. Sgt. C. H. Hargreaves; Flt. Sgt. J. Hay; Flt. Sgt. W. H. Spargo; Flt. Sgt. C. G. Johnston.

MISSING.—Flt. Sgt. R. J. Boag; Flt. Lt. S. L. Cary; P/O. L. H. E. Fairhead; F/O. R. D. Heath; Flt. Lt. K. V. Ingham; Flt. Sgt. J. A. Joyce.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—P/O. D. P. L. Hawkins.

KILLED ON ACTIVE SERVICE.—F/O. J. I. Kidgell.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. J. R. G. Morschel.

Royal Canadian Air Force

KILLED IN ACTION.—Flt. Sgt. H. J. Cook; Flt. Sgt. W. R. Darling; Flt. Lt. W. Fedoruk; Flt. Sgt. C. A. Fowler; F/O. S. G. Hall; F/O. S. R. Hanna; F/O. D. S. Howard; F/O. G. B. Johnson; F/O. C. W. Macklaier; F/O. J. R. Pollock; W/O. J. E. Porret; F/O. M. S. Sucharov; W/O. W. P. Wynnyk.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. W. H. Andrews; P/O. J. G. Bennett; P/O. C. W. Frauts; F/O. A. R. Mark; Sqn. Ldr. C. W. Smith; F/O. H. R. Wilson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. T. K. Canning; P/O. R. A. Carney; P/O. J. J. R. T. Godin; W/O. N. Leone; P/O. R. W. Link; F/O. G. S. Palin; F/O. D. MacD. Sim; F/O. J. D. Teskey; F/O. C. D. Wall.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—F/O. H. A. Hannah.

MISSING.—Flt. Sgt. R. J. Barr; F/O. J. A. Bryant; Flt. Lt. P. M. Charron; Flt. Sgt. R. C. Hase; F/O. R. A. Hiltz; F/O. A. J. Reid; Flt. Sgt. H. R. Thyret; W/O. E. P. Willisms.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—W/O. F. R. Hall; F/O. S. Tulloch.

KILLED ON ACTIVE SERVICE.—Sgt. J. J. P. O. Berlinguette; Sgt. G. A. Chevrier; W/O. W. H. Cyples; Flt. Sgt. J. L. M. Dube; F/O. J. L. G. G. Dumas; P/O. R. K. Gillis; Flt. Sgt. H. R. Irwin; Flt. Sgt. P. A. M. Jobin; Flt. Sgt. A. Malaidack; Sgt. J. L. N. Savard; P/O. J. E. Schwerdfager; Flt. Sgt. D. J. Spence; P/O. G. P. Wrigley; Flt. Sgt. H. R. J. Yerdon.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. H. A. Stock.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. J. R. McConnel.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Lt. R. D. Bamford.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. L. N. Atkinson; Flt. Sgt. W. A. Kilby; Flt. Sgt. E. H. Lankshear; F/O. A. G. MacDonald; P/O. K. D. Matheson; P/O. C. B. Muir; Flt. Lt. J. C. Ralph, D.F.M.; F/O. A. J. Sykes; P/O. P. Thompson.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. P. G. Allen.

MISSING.—F/O. J. A. McIntosh; Flt. Sgt. R. C. Morgan; Flt. Sgt. R. W. Newman.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—W/O. S. H. Burrow; W/O. A. D. Grant.

KILLED ON ACTIVE SERVICE.—F/O. W. W. D'A. Brain.

South African Air Force

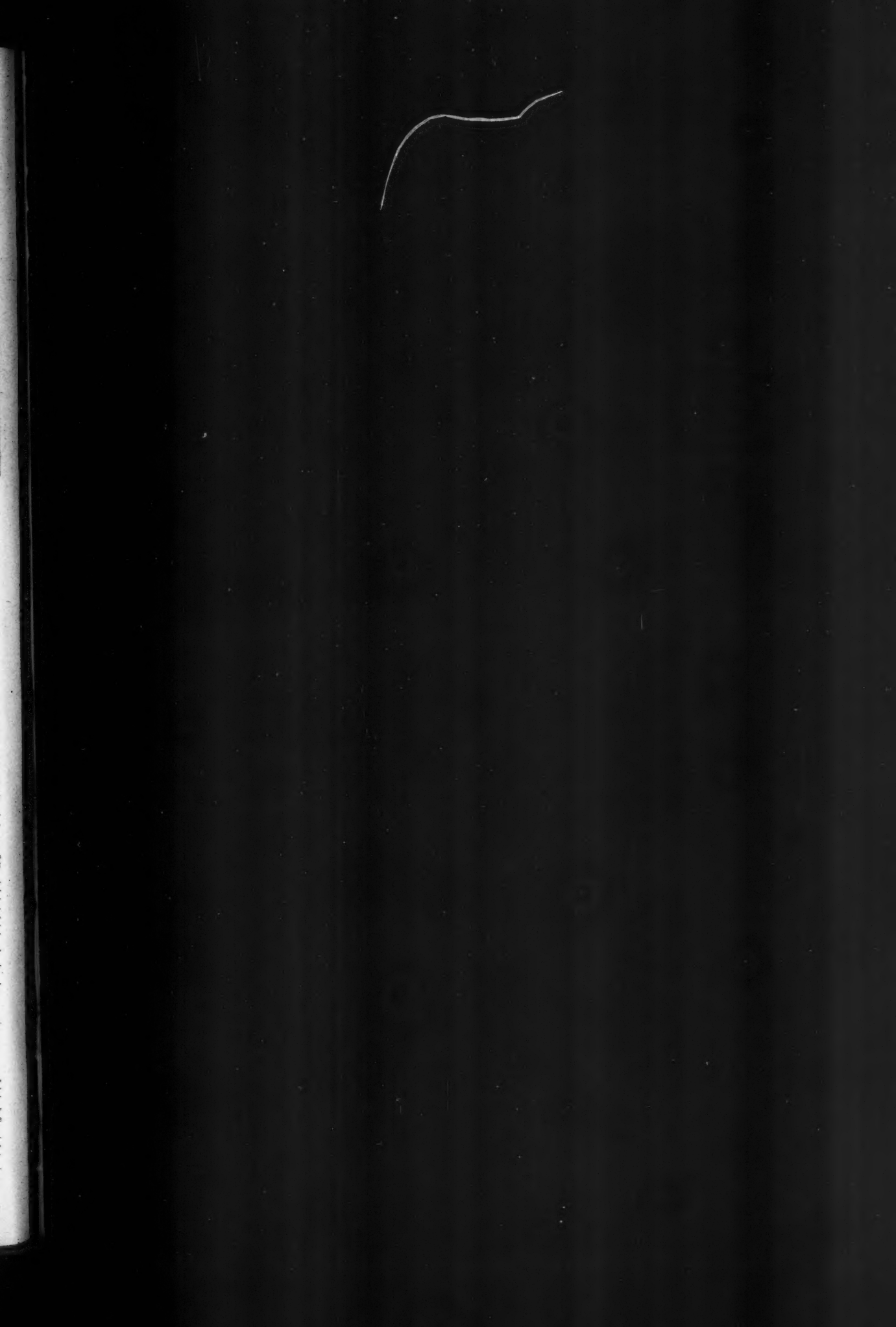
MISSING.—Lt. C. J. Coetzer; Capt. J. F. Kinnery; Capt. I. G. Will.

Official Corrections

Casualty Communiqué No. 482

Under "MISSING" delete Flt. Sgt. S. C. Alldis, Flt. Sgt. L. Croncy, F/O. E. W. Hookings, L.A/C. R. B. G. Rowley, Sgt. C. D. Vaughan, Sgt. R. G. Walters.

Under "PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION," (R.A.A.F.) delete P/O. C. W. Walker.

Under "MISSING" (R.C.A.F.) delete W/O. D. M. Davies, Flt. Lt. N. J. Ducas, Flt. Sgt. F. G. Hull, Flt. Sgt. R. C. Robinson, Sgt. W. A. Woods.

Under "KILLED ON ACTIVE SERVICE": Anderson, alter to read P/O. W. W. E.